Engineering

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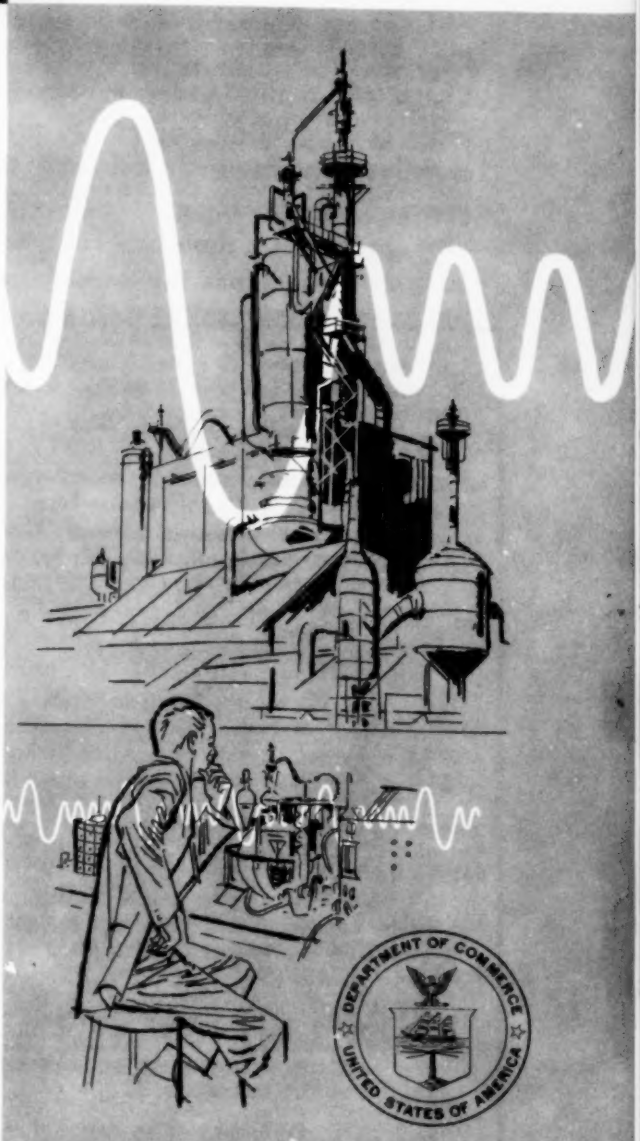

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Sinclair Weeks, Secretary

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OFFICE OF TECHNICAL SERVICES

Vol. 22, No. 4 October 15, 1954

CHEMICALS AND ALLIED PRODUCTS

Agricultural Chemicals

Chemical studies on fungicides. Part II: Synthesis, by W. E. Weaver and W. M. Whaley. U. S. Naval Research Laboratory. Jul 1946. 46p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114844

For Parts I, III-VIII see PB 100904-100906, 100096, 100093, 101140-101141, 110326.
1. Fungicides - Preparation 2. NRL P-2879.

Report of the Pest Infestation Research Board with the Report of the Director of Pest Infestation Research for the year 1953. Gt. Brit. Dept. of Scientific and Industrial Research. Pest Infestation Research Board. 1954. 53p photos, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 114658

S. O. code no. 47-153-0-53.
1. Pest control - Gt. Brit. 2. Insecticides - Evaluation - Gt. Brit. 3. Fumigants - Gt. Brit. 4. DDT - Insecticides - Gt. Brit.

Plastics and Plasticizers

Balloon material evaluation. Technical report no. 3, for period 1 Jan-31 Mar 1954, under Contract no. AF 19(604)-718, by L. W. Sheridan. General Mills, Inc. Engineering Research and Development Dept., Minneapolis, Minn. Apr 1954. 13p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114769

Tests were conducted on a new type of Saran film, designated Q853, which has improved low temperature properties. A polyethylene-mylar laminate was tested, and some tests were run on a mylar-mylar laminate, polyethylenecellophane laminate, and on Du Pont polyethylene. Some data are also included on aluminum foil laminated to plastic film. Report no. 1286. For reports no. 1-2 see PB 112477, 113729.

Epoxy adhesives and casting resins as photoelastic plastics, by J. D'Agostino, D. C. Drucker, C. K. Liu, C. Mylonas. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Apr 1954. 18p photos, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.75. PB 111456

Results are reported on the elastic and photoelastic properties of epoxy resins: Armstrong C-1, C-2, C-4, C-6, C-9, Cycleweld C-14, Araldite CN501, CN502. Contract DA-19-020-ORD-798. Dept. of the Army project 503-06-005. Ordnance project TB 3-0122. GDAM DA-798/10. APG BRL TR10.

Experiments with composite models, by C. Mylonas. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Jan 1954. 33p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114740

The present paper contains a review of problem and describes the development of a new cold setting photoelastic resin for making composite models and its use in the construction of lap and butt joints. Contract DA-19-020-ORD-798. Ordnance project TB 3-0122. Dept. of the Army project 503-06-005. GDAM DA-798/8. GDAM TR8.

Infrared spectra of plastics and resins, by R. E. Kagarise and L. A. Weinberger. U. S. Naval Research Laboratory. May 1954. 41p fold diagr,

graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.50. PB 111438

The infrared absorption spectra of ninety-two plastic and resinous materials have been studied in the region from 2 to 15 microns, and transmittance curves are given for 57 representative materials. A useful identification procedure based on the catalog of reference spectra has been devised in order to simplify and speed up the process of identifying an unknown plastic or resin. The advantages and limitations of this proposed method are discussed. NRL R 4369.

Mechanical properties at room temperature of four cermets of titanium carbide with nickel binder, by Aldie E. Johnson, Jr. U. S. National Advisory Committee for Aeronautics. Aug 1954. 22p photos, diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114995

Values of ultimate strength, modulus of elasticity, modulus of rigidity, Poisson's ratio in the elastic region, density, and hardness for the four materials are tabulated. NACA TN 3197.

Rheological properties of certain joint-sealing compounds for concrete canal linings, by E. R. Ballantyne. Australia. Commonwealth Scientific and Industrial Research Organization. Division of Building Research. 1954. 27p drawing, diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114833

1. Compounds, Sealing - Rheological properties - Australia 2. Compounds, Sealing - Extrusion equipment - Design - Australia 3. AUS CSIR BR TP 2.

Paints, Varnishes and Lacquers

Development of methods for predicting the service life of organic coatings for aircraft. Final report on Contract NOa(s)8697, by B. G. Brand, E. R. Mueller, E. E. McSweeney, E. N. Wyler, F. C. Todd, A. E. Austin, C. M. Schwartz, and H. R. Nelson. Battelle Memorial Institute, Columbus, Ohio. May 1949. 54p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114680

This report summarizes all phases of this investigation which has concerned itself principally with the development of possible electrical methods for determining the nature of changes taking place in organic coatings as aging progresses.

Ordnance Chemicals

Density and refractive-index measurements on some nitramines, by J. W. Murrin. U. S. Naval Powder Factory. Research and Development Dept., Indian Head, Md. May 1954. 10p graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114759

Values for the refractive indices at 2^{o} intervals from 20^{o} to 40^{o} C and the densities at 25^{o} C of various liquid nitramines are given. The molar refractions of these nitramines are calculated and values presented for the nitramino-group refractions. NPF MR 81.

Chemical Engineering and Equipment

Application of backside luggin capillaries in the measurement of nonuniform polarization, by M. Eisenberg, C. W. Tobias, and C. R. Wilke. California. University. Dept. of Chemistry and Chemical Engineering, Berkeley, Calif. Nov 1953. 19p photos, drawings, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114671

The backside capillary is demonstrated to be a suitable tool in the measurement of local values of polarization, particularly when interference with hydrodynamic conditions at the solution electrolyte interface needs to be avoided. The design and performance of several capillaries are described. Technical report no. 4 under Contract no. Nonr-222-(06), Project no. NR 359-270.

Numerical procedure for the analysis of pressure vessel heads, by T. Au, L. E. Goodman and N. M. Newmark. Illinois. University. Dept. of Civil Engineering. Feb 1951. 115p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.00, Photocopy $15.25. PB 114597

The need for more nearly exact methods of analysis of pressure vessel heads is supplied in this report by a numerical technique of wide applicability. While the method is approximate in the sense that the governing mathematical equations are satisfied only in finite difference form, it has the merit of simplicity and directly providing numerical values of normal forces, moments and shears needed in design. Contract N6ori-71, Task order VI, Project NR-035-183. Based on doctoral dissertation by T. Au. Appendix I. Annotated bibliography. - Appendix II. Classical and approximate solutions for spherical-segment head.

Miscellaneous Chemicals

Calculation of chemical equilibrium in a complex system, by Kenneth A. Kobe and Thomas W. Leland Texas. University. Bureau of Engineering Research, Austin, Texas. Apr 1954. 128p diagrs, graphs, tables Available from Bureau of Engineering Research, University of Texas, Austin, Texas. $2.00. PB 114609

The purpose of this discussion is to present a brief outline of the theory of reaction equilibrium calculations and to illustrate some of the methods by which it is applied. Special publication no. 26.

Coordination reactions of silver with special reference to the alkynes. Annual report, Jul 1, 1952 through Sep 31, 1953, under Contract Nonr-270-(00)-NR 055-252, by Howard J. Lucas, Alan E. Comyns, Forrest L. Carter and Thomas H. Applewhite. California Institute of Technology, Pasadena, Calif. Sep 1953. 27p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111429

1. Alkynes - Argentation 2. Acetylene, Diisopropyl - Synthesis 3. Silver compounds 4. Silver perchlorate - Reactions.

Dielectric constant effect upon the alkaline hydrolysis of methyl propionate, by John E. Quinlan and Edward S. Amis. Arkansas. University. Dept. of Chemistry, Fayetteville, Arkansas. Nov 1953. 12p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114676

The kinetics of the basic hydrolysis of methyl propionate in acetone-water media has been studied at 25.00° and 35.03° C. The effect of the dielectric constant of the medium on reaction rate has been interpreted according to an equation developed by Amis. The energies of activation and logarithms of the Arrhenius frequency factor for the various reaction media have been calculated and discussed. Technical report no. 6 under Contract Nonr-03700, Project NR 057-233.

I. Dielectric properties of liquid ethanol and 2-propanol, by F. X. Hassion and R. H. Cole. II. Dielectric properties of trimethylene glycol, by R. H. Cole and D. W. Davidson. Brown University. Metcalf Research Laboratory, Providence, R. I. Nov 1953. 62p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114688

Dielectric constants and loss were measured from room temperature to -160°C for the pure liquids and mixtures with small amounts of water to facilitate supercooling. The magnitudes and temperature dependences of the equilibrium dielectric constants are discussed in terms of Kirkwood's theory. An explanation of the multiple dispersions in terms of hydrogen bond breaking to permit reorientation of alkyl and hydroxyl groups is discussed. Technical report no. 1 under Contract Nonr-562(03) NR-051-284.

Effect of alkali and alkaline earth metal ions on the activity of cracking catalysts, by Joseph D. Danforth. Grinnell College, Grinnell, Iowa. 1953. 26p diagr, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111432

Sixth technical report, 1952-1953, under Contract no. N8onr-141, O.N.R. Project no. NR-356-141.

1. Hexadecane - Cracking 2. Catalysts, Cracking - Effect of alkali metal ions 3. Catalysts, Cracking - Effect of barium hydroxide 4. Catalysts, Cracking - Effect of lithium hydroxide 5. Catalysts, Cracking - Effect of potassium hydroxide.

Electrical properties of phthalocyanine, by David Kleitman. Purdue University. Dept. of Physics, Lafayette, Ind. Aug 1953. 75p photos, drawing, diagrs (1 fold), graphs (2 fold), tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $2.00. PB 111419

Technical report under Contract N7onr-39420.
1. Phthalocyanines - Electrical properties 2. Phthalocyanines - Research 3. Phthalocyanines - Photoconductivity 4. Conductors, Semi - Electrical conductivity.

Ethane hydrogenation-cracking on iron catalysts with and without alkali, by Alessandro Cimino, Michel Boudart and Hugh Taylor. Princeton University. Frick Chemical Laboratory. Mar 1954. 15p tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111424

A general formulation of the reaction kinetics is presented to include all the data here recorded and earlier work with nickel on the hydro-cracking of ethane and propane. Contract N6-onr-27018.

Final report under Contract AF 19(122)-380. Montreal. University. Dept. of Chemistry. May 1954. 85p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114683

The original Langsdorf diffusion cloud chamber has been modified so that the temperature gradient obtained can be controlled. The supersaturations thus produced can be calculated from a diffusion equation. The effectiveness of various inorganic nuclei in causing condensation in this supersaturated vapor has been studied.

Hydrides and borohydrides of light weight elements and related compounds. Technical report for the period Aug 1, 1952 to Jul 31, 1953 for Contract N6ori-20, T. O. 10, Project NR 356-255, by H. I. Schlesinger, Martin Steindler, and Grant Urry in cooperation with L. Hohnstedt, J. Kerrigan, and J. Murib. Chicago. University, Chicago, Ill. Aug 1953. 40p diagrs, graph, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.50. PB 111421

Solubility of diborane in ethyl ether between 0-25°C. and at 100-500 mm. pressure has been completed. Solubility of the diborane is not proportional to partial pressure. Assumptions are satisfactorily made that this is due to the partial formation of the borine etherate. The reaction between lithium borohydride and borofluoride seems to be irreversible in ether solution. Some progress is reported in the study of

the subchlorides of boron and their reactions. Two new solid hydrazine-borine derivatives, $N_2H_4.2B(CH_3)_3$ and $N_2H_4.B_2H_2.(CH_3)_4$ were prepared and investigated. As an approach to the study of borazole derivatives the preparation of B-chloro, and B-methyl borazoles were investigated. Metal alkyls were used in the studies to avoid use of ether. Some studies were reported on pyrolysis of mixtures of diborane and trimethylboron. The published papers of the staff are listed. For earlier reports see PB 109214 and PB 109541.

Investigation of methods of producing single crystals of non-metallic ferromagnetic substances. Third quarterly progress report, Jan 1st to Mar 31st, 1954, under Contract AF 19(604)-867, by John Koenig. Brush Laboratories Co., Cleveland, Ohio. Mar 1954. 39p photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114669

Brush report no. 532-3. For 1st report see PB 112795.
1. Autoclaves - Design 2. Crystals, Ferromagnetic - Production 3. Crystals, Magnetite - Growth 4. Crystals, Nickel ferrite - Growth.

Investigation of the chemical effects of ultrasonic waves. Final report covering the period of June 14, 1951 to June 14, 1953, under Contract no. Nonr-331 (00), by Virginia Griffing, Mary Evelyn Fitzgerald, Daniel Sette and Francis E. Fox. Catholic University of America. Chemistry Dept., Washington, D. C. Jun 1953. 33p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114752

1. Ultrasonics - Chemical effects 2. Carbon tetrachloride - Decomposition - Effect of ultrasonics 3. Noise, Cavitation.

Ionic polymerization. Ion pair chain mechanisms. Effect of different Lewis acid catalysts on the monomer reactivity ratios in copolymerization, by C. G. Overberger, R. J. Ehrig, David Tanner. Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N. Y. Oct 1953. 19p graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114332

With the copolymer system styrene, p-chlorostyrene in solvent mixtures of carbon tetrachloride and nitrobenzene, no difference in monomer reactivity ratios were obtained with aluminum bromide, ferric chloride, titanium tetrachloride, stannic chloride and titanium tetrachloride-trichloroacetic acid as catalysts in homogeneous solution. Technical report III under Contract no. Nonr 343(00) Project no. NR 356-262.

Molar refraction of carbon dioxide and its dependence on density and age, by C. E. Bennett and V. H. Coffin. Maine. University. Dept. of Physics, Orono, Maine. Aug 1953. 86p photo, diagr, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $2.00. PB 111406

Precise measurements for the determination of the molar refraction of carbon dioxide have been made over a density range from 0 to .06 gms/cc by displacement interferometry. The variation of the molar refraction with increasing density was observed over this density range for different samples of the gas, and comparisons have been made between observation on new and aged samples of gas. Final report under Contract N6ori-181, Project no. NR-015-302.

Properties of solutions in the neighborhood of the critical temperature of the solvent. Third technical report, period 1 Feb 1951-31 Jul 1953, under Contract No. N6-onr-238-11, by Sidney W. Benson, Charles S. Copeland, Peter E. M. Allen, James K. Fogo, David Pearson. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Aug 1953. 149p photos, drawings, diagrs, graphs (1 fold), tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $3.00. PB 111422

Certain features of the $NaCl-H_2O$ phase diagrams have been established. These are discussed alone and in connection with related behavior in the alcohol-iodide system. Thermodynamic calculations were made of the partial and apparent molal volumes and compressibilities. Calculated entropies and enthalpies of transition in some of the two- and three-phase equilibra of $NaCl-H_2O$ are presented. Electrical properties of this system were investigated and a description is given of the electrical apparatus and conductivity measurements. Some findings are given on $Cs-H_2O$, $Hg-H_2O$, $KI-H_2O$, and SO_3-H_2O. This latter system is a prototype of SiO_2-H_2O and also $P_2O_5-H_2O$ systems and is worthy of further consideration. For 1st report see PB 105257. Sec. III is The system $NaCl-H_2O$ at supercritical temperatures and pressures (Reprinted from Journal of Chemical Physics, vol. 21, no. 1, p. 12-16, Jan 1953). Sec. VIII is Pressure counterbalancing apparatus for the measurement of the electrical conductivity of aqueous solutions above their critical temperatures (Reprinted from Review of Scientific Instruments, vol. 22, no. 10, p. 765-769, Oct 1951).

Rotation-vibration spectra of ammonia in the 6- and 10-micron regions, by R. G. Breene, Jr. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Jun 1954. 46p graphs (part fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. Limited supply available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.75. PB 111504

1. Ammonia - Spectrographic analysis 2. AAF CRC TR 54-14 3. AAF GRD P 28.

Some derivatives of organophosphorous acids, by W. T. Dye, Jr. U. S. Naval Research Laboratory. Dec 1946. 51p Available from Library of Congress Publication Board Project, Washington 25, D. C.

Microfilm $3.00, Photocopy $7.75. PB 114856

This report deals with the synthesis, analysis, and use of organophosphorus compounds characterized by direct carbon-to-phosphorus bonds. Most of the compounds studied are derivatives of aromatic phosphinic and phosphonic acids. NRL P-3044.

Studies on the mechanism of the autoxidation of unsaturated fatty acid esters. Final report on Contract no. N8ONR-66209(NR 055-251). Hormel Institute, Austin, Minn. n. d. 34p graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111431

Summarizes 2 years of research on the basic reactions of unsaturated fatty acid esters. Elucidation of the mechanism stems from kinetic data and from other information. Improved solvent techniques for quantitative separations were developed. An improved colorimetric method for estimating organic peroxides is being developed.

ELECTRICAL MACHINERY

Electronics

Alternative field representations in regions bounded by spheres, cones, and planes, by Leopold B. Felsen. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Jan 1954. 58p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114305

Alternative representations are obtained directly by the method of characteristic Green's functions for the fields radiated by arbitrarily placed scalar and vector point sources in regions bounded by surfaces which are describable in terms of single coordinates in a spherical coordinate system. Such surfaces are spheres, cones, and planes, or a combination of these. The representations are distinguished from one another by different convergence properties for various ranges of values of the location of source and observation points and of the boundary surface geometry. Considered in particular are the diffraction by a sphere, a wedge, a wedge with a spherical dome, a cone, and a cone with a spherical tip. Contract AF-19(604)-890. PIB R 359-54. PIB 293.

Boundary problem in ionospheric wave propagation, by Albert J. Mallinckrodt. Stanford University. Radio Propagation Laboratory. May 1954. 92p diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photocopy $12.75. PB 114628

A new approach to the boundary problem in ionospheric wave propagation is developed under a minimum of restrictive conditions. A new concept of "characteristic waves" is developed to permit rigorous expression of the results in a form that is a convenient and logical extension of the classical magneto-ionic modes. Contract AF 19(604)-795. SU RPL TR 2.

Broadband microwave components. Final engineering report under Contract no. W36-039-sc-32259. Sperry Gyroscope Co., Great Neck, N. Y. Oct 1948. 247p photos, drawings, diagrs (part fold) graphs (part fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.25, Photocopy $31.50. PB 114344

This report summarizes the research and developmental work accomplished which has resulted in new techniques and design for the construction and application of broadband waveguide components in X-band (6500 to 10,000 mc) and K-band (18,000 to 26,000 mc). Sperry engineering report no. 5224-1118. Appendix A. Broadband application of cascaded quarter-wave sections of transmission line. - Appendix B. SWR and losses of a variable shorting bar. - Appendix C. Measurement of SWR by resonance method. - Appendix D. Moreno type crossed-waveguide directional-couplers. - Appendix E. Symbols.

Calculation of the speed necessary in the production of the pinch if there is to be no E-folding of Schwarzchild-Kruskal instability in the pinch, by Winston H. Bostick and Morton A. Levine. Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Mar 1954. 9p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114765

Contract no. AF 19(122)-89. Scientific report no. 13. 1. Gases, Ionized - Effects of radio frequency 2. Gas flow - Compression shocks 3. Gas flow - Theory 4. Pinch effect 5. Schwarzchild-Kruskal theory.

Development and application of automatic assembly techniques for miniaturized electronic equipment. Stanford Research Institute, Stanford, Calif. Contract AF 18(600)-141. SRI Project no. 597. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Interim engineering report no. 1, covering period 1 Mar 1952 to 30 Apr 1952, by Freeman M. Hom and Low K. Lee. May 1952. 18p Microfilm $2.00, Photocopy $2.75. PB 114897

Continues Contract AF 33(038)-18976. (SRI Project 413). For report no. 1 and Final report on this contract see PB 109418, PB 110783. 1. Electronic equipment - Miniaturization 2. Assembling methods 3. SRI Proj 597, Report no. 1.

Interim engineering report no. 6, covering period 1 May to 31 Jul 1953, by E. R. Gamson, F. M. Hom, R. F. Newton. 1953. 48p photo, drawings, diagrs, graph, tables Microfilm $2.75, Photocopy $6.50. PB 114898

1. Electronic equipment - Miniaturization 2. Assembling methods 3. Bonding - Effect of etchants 4. Etching, Nitric acid - Control systems - Design 5. Adhesives, Ceramic to metal - Tests 6. Screens, Printing - Silk - Coatings 7. SRI Proj 597, Report no. 6.

Interim engineering report no. 7, covering period 1 Aug to 31 Oct 1953, by E. R. Gamson, F. M. Hom, R. F. Newton. Dec 1953. 52p photos, drawings, diagrs Microfilm $3.00, Photocopy $7.75. PB 114899

1. Electronic equipment - Miniaturization 2. Assembling methods 3. Soldering - Methods 4. Etching, Nitric acid - Control systems - Design 5. Tools - Holding 6. SRI Proj 597, Report no. 7.

Interim engineering report no. 8, covering period 1 Nov 1953 to 31 Jan 1954, by E. R. Gamson, F. M. Hom, R. F. Newton. Apr 1954. 53p photos, drawings, diagrs, graph, tables Microfilm $3.00, Photocopy $7.75. PB 114900

Photos will not reproduce.
1. Electronic equipment - Miniaturization 2. Assembling methods 3. Coatings, Protective - Tests 4. Etching, Nitric acid - Control systems - Design 5. Electronic equipment - Components - Attaching machinery - Design 6. Screens, Printing - Silk 7. SRI Proj 597, Report no. 8.

Development of broadband absorbing materials for frequencies as low as 500 Mc, by W. H. Emerson, A. G. Sands, and M. V. McDowell. U. S. Naval Research Laboratory. May 1954. 13p drawings, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114686

Two new broadband absorbing materials have been developed for use in anechoic chambers to facilitate indoor antenna measurements at lower frequencies. Both are in the form of a loosely spun mat of animal hair which has been impregnated with rubber containing carbon black to dissipate r-f energy. NRL MR 300.

Development of subminiature high-temperature capacitors. Interim engineering report no. 5, for the period 28 Jan 1954 to 28 Apr 1954, by H. Mack Thaxton. Balco Research Laboratories, Newark, N. J. May 1954. 25p drawings, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114895

Fabrication data, test results, and case construction and design are given in this report. Contract no. AF 33(038)-17190, Supplemental agreement no. 3. For Interim reports 1-3 see PB 112003, PB 112838, PB 113711.

Further measurements on the pinch effect in nitrogen and helium, by Winston H. Bostick, Morton A. Levine, and Lewis S. Combes. Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Mar 1954. 17p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114744

An attempt is made to measure the degree of spatial thermal equilibrium across the pinch by measuring the relative intensities of N+ and N++ lines, and He and He+ lines as a function of lateral displacement across the tube. The results are crude but seem to indicate a departure from spatial thermal equilibrium in helium (initial pressure 0.02 mm Hg) and at the lower initial pressures in nitrogen (.003 mm Hg). A comparison is made between the experimental and the Gaussian and Bennett distributions. Some data are presented on the variation of the pinch radius as a function of initial pressure. Contract no. AF 19(122)-89. Scientific report no. 12.

Instruction book for radar indicating equipment, Navy model VF, manufactured by Raytheon Manufacturing Co., Waltham, Mass. U. S. Bureau of Ships. May 1949. 397p photos, drawings (part fold), diagrs (part fold, part col), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.25, Photocopy $50.25. PB 113865

Contract NXss-31388. Color in diagrs will not reproduce.
1. Radar equipment - Design 2. Radar equipment - Operation 3. Radar - Scopes 4. VF (Radar) 5. NAVSHIPS 900,858.

Low frequency, continuous wave, ionosphere research, by C. W. Bergman, R. S. Macmillan, W. H. Pickering. California Institute of Technology. Electrical Engineering Dept. Oct 1953. 98p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photocopy $12.75. PB 114489

A new, continuous-wave, phase-measuring technique for ionospheric observations at low and very-low frequencies is described. The applicability of the quasi-homogeneous, magneto-ionic theory to low-frequency-propagation problems is considered. Final report under Contract Nonr-220(07) (Apr 1, 1952-Mar 31, 1953).

Mass transfer in electrode processes. II: Mass transfer at rotating cylinders, by M. Eisenberg, C. W. Tobias, and C. R. Wilke. California. University. Dept. of Chemistry and Chemical Engineering, Berkeley, Calif. Sep 1953. 51p photos, diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $8.00. PB 114943

Rates of mass transfer at circular cylinders rotating about their axes in the center of stationary cylinders were studied by means of solid dissolution and electrolytic redox reactions. A general correlation

of the mass transfer data was obtained. Technical report no. 2 under Contract no. Nonr-222(06) Project no. NR 359-270. For part III see PB 114495.

Measurement of dielectric constant and loss with standing waves in coaxial wave guides, by A. von Hippel, D. G. Jelatis, and W. B. Westphal. Massachusetts Institute of Technology. Laboratory for Insulation Research. Apr 1943. 72p photo, drawings, diagrs, graphs (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photocopy $10.25. PB 114853

Contract OEMsr-191.
1. Wave guides, Coaxial - Electrical properties 2. Dielectrics - Constants - Measurement 3. Dielectric research.

Method of producing broadband circular polarization in square waveguide, by Alan J. Simmons. U. S. Naval Research Laboratory. Jan 1954. 19p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114770

The theory of the periodically loaded waveguide is used in conjunction with the theoretical values for iris susceptance to find values of the parameters of the waveguide which maximize bandwidth. Experimental measurements on optimum phase shifters confirm the theory fairly closely. Comparison with dielectric quarter-wave plates shows comparable bandwidth. NRL R 4286.

Methods of solution of ordinary differential equations of first order in the real domain. Graduate lecture notes by E. Weber, collected by L. Vallese. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Sep 1953. 43p diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114257

A summary of the general theory of nonlinear differential equations of first order is given, with the aim of providing practical working rules for the analysis of technical problems, without pretense to rigor and completeness. In general, only equations of first order are considered here. After a discussion of the existing conditions and the analysis of singular points and of the integral solutions of the few types of equations which can be integrated in closed form, principal analytical and graphical procedures for the approximation of the solutions are described. Contract N6ori-98, Task order IV, Project NR-075-214. Second in a series of reports on the analysis of nonlinear circuits. For first report see PIB 210. PIB R-340-53. PIB 275.

Natural behavior of broadband circuits, by William H. Huggins. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. R-F Components Laboratory, Cambridge, Mass. Nov 1948. 36p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. Limited supply available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 100635r

In this paper, various broad-band i-f and video circuits are examined for their natural behavior and it is shown that they are basically alike in that the natural frequencies are distributed according to the same, simple geometrical pattern about the passband. Revision of PB 100635. AAF CRL E5013A.

Network approximation in the time domain, by William H. Huggins. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. RF Components Laboratory, Cambridge, Mass. Oct 1949. 64p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. Limited supply available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.25. PB 99352r

This paper is concerned with the problem of network synthesis and design necessary to achieve an optimum time (i.e., transient) response. Two optimum criteria are discussed: the least-square error of Norbert Wiener and the "matched-filter" design of North, Van Vleck, and Middleton. An illustrative design of a matched receiver for rectangular pulses concludes the paper. Reprint of PB 99352. AAF CRL E5048A.

Physical realization of an electronic computing instrument. Final progress report on Contract DA 36-034-ORD-19, by Herman H. Goldstine, James H. Pomerene, Charles V. L. Smith. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N. J. Jan 1954. 236p drawings (part fold), diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $8.50, Photocopy $30.25. PB 114760

Project no. TB 3-0007F. Contents: Part I: Tex. - Part II: Drawings.
1. Computers, Electronic - Design.

Plane wave scattering by small-angle cones, by Leopold B. Felsen. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Feb 1954. 28p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114307

Rigorous expressions are developed for the scattering of acoustic (and electromagnetic) waves by the tip of a perfectly rigid (or perfectly conducting) semi-infinite cone. For plane wave incidence on or off the cone axis, the expressions are valid for observation points lying in a region excluding the rays which are reflected from the sides of the cone

according to the laws of geometrical optics. Approximate closed form results are obtained for cones with small apex angle for the acoustical plane wave scattering, and for electromagnetic scattering of incident waves whose electric vector is directed perpendicular to the cone axis. Contract AF 19(604)-890. PIB R-362-54. PIB 296.

Polarization of radio waves reflected from the ionosphere at nonvertical incidence. I: Theoretical background, by George Inouye. Harvard University. Cruft Laboratory. Sep 1953. 123p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.25, Photocopy $16.50. PB 114790

The magneto-ionic theory of radio wave propagation in the ionosphere is reviewed towards the understanding of the various features associated with the polarization of the downcoming waves which have traversed a nonvertical path. Contract N5ori-76, Task order I, NR-078-011. HU CL TR 190.

Principles governing the construction of shielded rooms, by Edward M. T. Jones. Stanford Research Institute, Stanford, Calif. Apr 1951. 47p drawing, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114742

This report presents an analysis of the mechanism of shielding electromagnetic energy in one region from another, and specific recommendations, based on the analysis, for the construction of a shielded room to offer 120 db attenuation to all signals from 15 kc - 24,000 Mc. Contract NOy-22272. SRI Project no. 336, Technical report no. 1.

Propagation in semi-infinite waveguides. Six papers by L. A. Vajnshtejn. Translations from the Russian by J. Shmoys. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jan 1954. 133p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.75, Photocopy $17.75. PB 114766

Contract no. AF 19(122)-42. Contents: I. Rigorous solution of the problem of an open-ended parallel-plate wave guide. (From Izv. Akad. Nauk., ser. Fiz., 12, 144-65, 1948.) - II. On the theory of diffraction by two parallel half-planes (From Izv. Akad. Nauk., ser. Fiz., 12, 166-180, 1948). - III. Theory of symmetric waves in a cylindrical waveguide with an open end (From Zhurnal Tekh. Fiz. 18, 1543-1564, 1948). - IV. Theory of sound waves in open tubes (From Zhurnal Tekh. Fiz. 19, 911-30, 1949). - V. Radiation of asymmetric electromagnetic waves from the open end of a circular waveguide (From Doklady Akad. Nauk., 74, 485-8, 1950). - VI. Diffraction at the open end of a circularly cylindrical waveguide whose diameter is much greater than wavelength (From Doklady Akad. Nauk., 74, 909-12, 1950).

Propagation of 8.6-millimeter radio waves over a 50 mile path, by C. W. Tolbert, A. W. Straiton, C. D. Tipton. Texas. University. Electrical Engineering Research Laboratory. Oct 1953. 30p photos, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114496

Propagation measurements are reported for a wavelength of 8.6 millimeters over a line-of-sight path 50 miles long. Simultaneous measurements on a wavelength of 3.2 centimeters are used for comparison with millimeter data. Contract Nonr-375(01). TU EERL 70.

Radiation patterns and radiation fields, by Claus Müller. New York University. Institute of Mathematical Sciences. Div. of Electromagnetic Research. Mar 1954. 18p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114777

This paper deals with the asymptotic behavior at infinity of the solutions of the scalar wave equation which satisfy a radiation condition. Contract no. AF 19(122)-42. NYU IMM EM-62.

Some aspects of cavity resonator loss behavior, by Frederick W. Schott and Milton B. Adams. Stanford University. Electronics Research Laboratory, Stanford, Calif. Feb 1949. 42p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 113958

Contract N6-onr-251, Consolidated task no. 7 (NR-078-300).
1. Resonators, Cavity - Electric properties
2. Shunts, Electric - Resistance 3. Networks, Electric - Properties 4. SU ERL TR 10.

Study of the generation and detection of electromagnetic waves in the millimeter wave region. Report no. 22 under Contract AF 19(122)-4, Jan 1, 1954 to Mar 31, 1954, by J. H. Rohrbaugh. New York University. Washington Square College of Arts and Science. Physics Dept. Apr 1954. 26p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114491

Further calculations are given regarding the Finkelstein and the Greig-Ferguson grating mounts. Additional discussion of the problems that arise in connection with the measurement of the indices of refraction of liquids is also presented. Two suggestions regarding the measurement of gas absorption are evaluated.

UHF filtering networks. Second report of technical progress under Contract no. AF 19(604)-962, by D. E. Mode. Lehigh University. Electrical Engineering Dept., Bethlehem, Pa. May 1954. 16p drawings, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114751

A number of mechanical means for obtaining dispersive characteristics in waveguide systems are described and some preliminary analyses are presented. First tests on a system using coaxial hybrids with a coaxial dispersive structure in one arm are reported.

Generators, Motors, Transmission

Development of miniaturized hermetically sealed and open preferred line power transformers. Final report, May 1949-Feb 1952, under Contract W 36-039-sc-44500. Essex Wire Corporation. Chicago Transformer Division, Chicago, Ill. Feb 1952. 663p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.25, Photocopy $84.25. PB 114607

The object of this contract was to design and produce representative transformers of a series of specific electrical ratings. Each electrical rating required a hermetically sealed and open design for both 60 cycles and 380-2400 cycles. These units were to be made as small as possible in size and weight. Miniaturization was accomplished through the use of premium core materials capable of being operated at the highest possible flux densities, and through the use of premium insulating materials, capable of being operated at high temperatures. A hermetically sealed construction was developed and life tested. Dept. of the Army project: 3-20-00-600. Signal Corps project: 32-2006-31. SIG Contract W 36-039-sc-44500, Final report.

Single tube spectrum generator for high order harmonics, by L. R. Battersby and A. Hahnel. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Jan 1954. 10p photo, diagr, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114775

A periodically phase controlled uhf oscillator is described which utilizes one quartz crystal and only one vacuum tube to provide a spectrum of stabilized 1 mc spaced frequencies in the 250-500 mc band. Dept. of the Army project no. 3-99-12-021. Signal Corps project no. 132A. SCEL TM M-1558.

Transistor circuit components, by Charles E. Doyle. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1954. 22p photos Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. Limited supply available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 114778

1. Transistors - Circuits - Components 2. Capacitors - Design 3. Potentiometers - Design 4. Power supplies - Design 5. Resistors, Fixed - Design 6. Transformers, Radio frequency - Miniaturization 7. Transformers, Itermediate frequency - Miniaturization 8. Transformers, Audio - Miniaturization 9. AAF WCRE TN 54-8.

Miscellaneous

Air-coolers for high power vacuum tubes, by A. L. London. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Aug 1953. 30p photo, diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114821

The objectives of this paper are to present the factors relating to the heat transfer design of an annular air-cooler of the axial-flow type, in which the extended surface consists of a large number of radial fins. Performance equations derived from basic heat transfer and fluid flow theory are presented; application of the theory is illustrated by a specific design; and the validity of the design method is demonstrated by results of tests. Some problems requiring further analysis and experimental work are also considered briefly. Contract N6onr-251, Task order VI (NR-090-104). SU ME TR 18.

Analysis of a relay servo mechanism, by Jacob Leeder. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1953. 57p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114736

The solutions for the transient and steady state response of the servo when subjected to a step input, and a constant velocity input are given in the form of plots in the phase plane. The parameters defining the response of the servo are expressed in terms of the physical and electrical constants of the system. Some of the characteristics of this relay system are analyzed, particularly with reference to applications in relay servo systems. Dept. of the Army project no. 503-06-011. ORD project no. TB-3-0538C. APG BRL M 720.

Analytical method for the design of relay servomechanisms, by John E. Hart. U. S. Naval Research Laboratory. May 1954. 22p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114761

A method for designing relay servomechanisms has been established on the basis of derived analytical criteria for stability and deadbeat operation. Consideration is given to stabilization of a relay servomechanism, by means of linear-velocity feedback and velocity-squared feedback. The advantages and disadvantages of each depend upon the particular application. NRL R 4361.

Crystal diode ring multipliers, by R. H. Wilcox. U. S. Naval Research Laboratory. Jun 1954. 12p

photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114763

A study has shown that crystal diode rings form accurate passive four-quadrant multipliers at low voltage levels. They offer the advantages of simplicity, compactness, and dependability. NRL R 4385.

Electron tube vibration output measurements (as of 2 Nov 1953), by Gerard E. Boyan. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Feb 1954. 80p photo, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photocopy $10.25. PB 114801

This report deals with the techniques and equipments utilized to perform these electron tube noise output tests and includes copies of the recorded data on a number of tube types. Dept. of the Army project no. 3-19-01-021. Signal Corps project no. 302A. SCEL TM M-1562.

Experimental investigation of the transmission properties of the dominant circular-electric mode, by Leonard S. Sheingold. Harvard University. Cruft Laboratory. Sep 1953. 71p photos, drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photocopy $10.50. PB 114278

A novel method of measuring impedance in a circular waveguide supporting only the dominant circular-electric mode is described. A complete description of the experimental arrangement used in the TE_{01} impedance measurements is presented. Results are given of precise impedance measurements made on circular obstacles, circumferential gaps and radiating guides. These experimental results are compared with theoretical values and are found to be in excellent agreement. It is demonstrated that application of Deschamps' graphical method in the experimental determination of the scattering parameters of a circumferential-gap-junction results in a rapid determination of the pertinent quantities. Contract N5ori-76, T. O. no. I, NR-078-011. HU CL TR 167.

High frequency crystal-controlled oscillator circuits. Final report (no. 11) under Contract no. W36-039-sc-86841, 1 May 1948 to 31 Dec 1950, by William A. Edson, William T. Clary, James C. Hogg, Jr. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Dec 1950. 270p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.25, Photocopy $34.00. PB 114590

This report presents the results of an extended investigation of the properties and limitations of oscillator circuits for the operation of high-frequency quartz crystal resonators. The frequency region of principal interest is 50 to 150 Mc, but most of the results are applicable with minor variation at lower frequencies, and some of the circuits are capable of operation at somewhat higher frequencies. The first portion of the report is general in nature and presents background information applicable to all types of circuits and in all frequency ranges. The latter portion of the report is much more specific. It discusses the properties, advantages, and limitations of the more important circuits, and presents criteria for selecting a circuit and adjusting the elements so as to realize the design conditions. Project no. 131-45. Dept. of the Army project: 3-99-11-022. Signal Corps project: 142 B. SIG Contract W36-039-sc-36841, Final report.

High temperature magnet wire. Final engineering report under Contract no. W-36-039-sc-38142. Sprague Electric Co., North Adams, Mass. Apr 1951. 51p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114802

Dept. of the Army project no. 3-93-00-500. Signal Corps project no. 2005. Includes "The trimer of o-phthalonitrile, by Sidney D. Ross and Morton Fineman. Reprinted from Journal of the American Chemical Society, v. 72, p. 3302-3303, 1950. 1. Wire - Insulation 2. Magnet coils - Materials 3. Insulation, Electrical - Materials 4. Ceroc-Teflon (Insulating material) 5. o-Phthalonitrile - Preparation 6. SIG Contract W-36-039-sc-38142, Final report.

Mass transfer in electrode processes. III: Ionic mass transfer and concentration polarization at rotating electrodes, by M. Eisenberg, C. W. Tobias and C. R. Wilke. California. University. Dept. of Chemistry and Chemical Engineering, Berkeley, Calif. Oct 1953. 50p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114495

Rates of ionic mass transfer at nickel electrodes rotating about their axes in the center of stationary electrodes were studied using the ferri-ferrocyanide couple in alkaline solutions. Technical report no. 3 under Contract Nonr-222(06), Project NR359-270.

Measurement of nonlinear distortion in receiver multicouplers, by S. R. Swanson. U. S. Naval Research Laboratory. May 1954. 12p diagr, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C Microfilm $2.00, Photocopy $2.75. PB 114762

From this study to develop a standard method for obtaining the distortion characteristics of a multicoupler, it was found that the determination of the magnitude of the intermodulation frequencies by means of the equivalent-signal method is most appropriate. The many precautions necessary, such as choice of frequencies and elimination of signal generator harmonics, to obtain accurate results are indicated. Appendix A: Summary of theoretical distortion relations. NRL R 4374.

Position and polarization of solar radio bursts on 200 Mc/S, by Takeo Hatanaka. Cornell University. School of Electrical Engineering, Ithaca, N. Y. Dec 1953. 83p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114304

It is known that solar radio bursts in the meter wavelength range are sometimes observed to be randomly polarized and sometimes circularly polarized, and bursts are roughly classified by their polarization. But little study has been done on the nature of the polarization of bursts when they are not circularly polarized. It is the purpose of the present paper to investigate this point by using the observations made by a circularly polarized system, a linearly polarized system and an interferometer. Contract AF 19(604)-73. Scientific report no. 2.

Progress report, Jan-Mar, 1954. National Research Council of Canada. Radio and Electrical Engineering Division. Apr 1954. 22p photos, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. Limited supply available free from Radio and Electrical Engineering Document Office, National Research Council, Ottawa, Canada. PB 114860

1. Navigational aids - Canada 2. Antennas - Research - Canada 3. Tubes, Electron - Research - Canada 4. Radar - Research - Canada 5. Engineering, Electrical - Canada 6. Dielectric research - Canada 7. Electromedical research 8. NRCC ERA 265.

Research and development of composite dielectric materials, by H. N. Homeyer, Jr., D. C. Dougall, J. H. Preston. Final report, 15 Jun 1952 through 15 Dec 1953, under Contract no. DA36-039-sc-42465. Connecticut Hard Rubber Co., New Haven, Conn. Dec 1953. 93p photos, drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photocopy $12.75. PB 114206

This report describes the development and fabrication of composite dielectric materials which maintain high insulation resistance under prolonged exposure to extremes of both humidity and temperature. Dept. of the Army project no. 3-93-00-53. Signal Corps project no. 32-2005D. SIG Contract DA36-039-sc-42465, Final report.

Television receiving antennas, by W. R. Ford and H. W. Schultz, Jr. Kansas. Engineering Experiment Station, Manhattan, Kansas. Jun 1954. 15p photo, diagrs, graphs, table Available from Engineering Experiment Station, Kansas State College, Manhattan, Kansas. PB 114342

Kansas State College Bulletin vol. XXXVIII, no. 8.
1. Antennas, Television 2. Television - Receivers 3. K EES C 7.

Über neuartige kohle-sauerstoff-elektroden, I. Mitteilung (Carbon-oxygen electrodes of more recent type, first report, by Karl Kordesch and Adolf Marko. Translated and edited by F. A. Raven. Mar 1954. 29p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 113861s2

From Österreichische Chemiker-Zeitung vol. 52, no. 7, 1951, p. 125-131.
1. Electrodes, Carbon-oxygen - Austria 2. NAVSHIPS T 551, Part 3 4. STS 187c.

FUELS AND LUBRICANTS

Development of qualification test methods for gear lubricants. Progress report no. 21, Mar 15-Apr 15, 1954, under Contract no. DA-11-022-ORD-905, by M. J. Ramirez. Armour Research Foundation, Chicago, Ill. Apr 1954. 7p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114725

The aim of this project is to study the effect of test variables on test results obtained in laboratory axle lubricant moisture corrosion tests, and to develop a reproducible laboratory evaluation procedure which can be used to determine the potential corrosiveness of such lubricants in military and commercial field service. Project no. TB 5-3010. ARF Proj L030, Report no. 21.

Ignition studies. Part III: Ignition properties of the isomeric hexanes, by J. E. Johnson, J. W. Crellin, and H. W. Carhart. U. S. Naval Research Laboratory. Apr 1954. 22p graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.75. PB 111446

The spontaneous ignition of the isomeric hexanes was investigated at atmospheric pressure as a function of time, temperature, and partial pressure of oxygen. The minimum ignition point (MIP) correlates with certain well-known oxidation and ignition criteria including the rate of slow oxidation of hydrocarbons, Hinshelwood's methyl retardation factor, research octane number and, by implication, with cetane number. For Parts I-II see PB 106126 and PB 111215. NRL R 4346.

New approaches to the determination of the thermodynamic-hydrodynamic properties of detonation processes, by W. Hoyt Andersen and Ransom B. Parlin. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Oct 1953. 25p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114791

Contract N7onr-45107, Project no. NR-357-239. Technical report no. 28.
1. Detonation - Theory 2. Chapman-Jouguet theory 3. Explosives - Detonation theory.

Proceedings of a coal briquetting conference sponsored by the Natural Resources Research Institute, University of Wyoming, Aug 2-3, 1951, Superior, Wis. Wyoming. University. Natural Resources Institute, Laramie, Wyo. Oct 1951. 101p drawings, diagr, graphs, tables Available from Natural Resources Research Institute, University of Wyoming, Laramie, Wyo. PB 114880

Information circular no. 5. Contents: Address of welcome, by R. E. Baumberger. - Briquetting in the present energy picture, by Ivan A. Given. - Briquetting in western Canada, by J. G. Miller. - Coal briquetting in Japan, Germany, and Australia, by Lajos Szeszich and Charles C. Boley. - Briquetting machinery for coal and other materials, by Paul D. Haigh. - Specific gravity variations of coal briquets, by L. W. Corbett, F. B. Odasz and J. G. Miller. - Laboratory and commercial trials of spent sulphite liquor-asphalt emulsions for briquetting of coal, by A. J. Wiley, M. F. Kummer, C. R. Faulkender, and Bernard Van Camp. - Comparison between sulphite liquor-asphalt emulsions and straight asphalt as binders for coal briquets, by Neal Rice and Celia H. Bollich. - Briquetting practices and problems, by C. W. Link. - Trends in the central states briquetted fuel market, by L. C. Krchma. - Flash drying of coal in connection with briquetting, by C. W. Gordon. - Coal balling experiments, by J. L. Carveth and W. A. Lang. - Reduction of iron oxides with lignite, by C. V. S. Ratnam.

Perfluorination of dimethyl-substituted fluoranthenes, by S. Bonotto, G. B. Duhnkrack and D. S. Trifan. Princeton University. Plastics Laboratory. Jul 1954. 86p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114709

A modification of existing methods of perfluorinating hydrocarbons over AgF_2 was developed and employed in the perfluorination of dl-cis-1,4-dimethylfluoranthene, dl-cis-1,4-dimethyl-2,3-dihydrofluoranthene, and fluoranthene to obtain a low loss-low K liquid dielectric having a very wide liquid range, etc. The distillation fractions were examined in detail, including dielectric and infra-red spectra analysis. Contract report 2A, Contract no. DA-36-039-sc-42533. Dept. of the Army project: 3-99-15-022. Signal Corps project: 32-152 B. SIG Contract DA-36-039-sc-42633. PU PL TR 34A.

Project Squid, semi-annual progress report for the period 1 Apr 1953 to 30 Sep 1953 under Contract N6ori-105, Task order III, NR-098-038. Princeton University. James Forrestal Research Center. Oct 1953. 149p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.00, Photocopy $19.00. PB 114392

For earlier report (Apr 1951) see PB 107680. Contents: Mixing of supersonic and subsonic gas streams, by J. V. Charyk. - Fundamental investigation of nonstationary flow phenomena, by G. Rudinger. - Investigation of turbulence, by Leslie S. G. Kovasznay. - Transport properties of liquids, by Ernest F. Johnson. Heat conductivity of gases over a range of temperatures and pressure, by Frederick G. Keyes. - Prandtl number determination by means of recovery factor measurements, by R. A. Seban. - Measurement of convection and radiant heat transfer coefficients for hot gases, by M. J. Zucrow, and Elliott L. Katz. - Investigation of coolant film stability in the two- and three-dimensional cases, by M. J. Zucrow and Arthur B. Greenberg. - Porous cooling studies, by S. W. Yuan and P. A. Libby. - Vaporization and combustion of multicomponent fuel droplets, by G. G. Lamb. - Combustion studies with pre-mixed partly vaporized fuels, by J. A. Browning. - Investigation of the basic problems associated with gaseous combustion, by K. Wohl. - Investigation of flame propagation and stability with particular reference to the interaction between flame and flow, by G. H. Markstein. - Research on flame and ignition phenomena, by Bernard Lewis, Guenther von Elbe, Bela Karlovitz. - Minimum spark ignition energy and the source of ionization in flames, by H. F. Calcote. - High output combustion, by Hoyt C. Hottel and Glenn C. Williams. - Turbulent flames, flame stability, and rough burning, by A. C. Scurlock. - Combustion studies, by R. N. Pease. - Investigation of ignition lag of spontaneously ignitable propellants, by M. J. Zucrow. - Ignition characteristics of fuel droplets falling in an oxidizing atmosphere, by M. J. Zucrow and D. A. Charvonia. - Flow and combustion in rocket motors, by J. V. Charyk. - Appendix A: Reports published Apr 1, 1953-Oct 1, 1953.

HIGHWAYS AND BRIDGES

Excerpts from the sixth annual Kentucky Highway Conference, Mar 10-11, 1954, edited by E. Everett Elsey. Kentucky. Engineering Experiment Station, Lexington, Ky. Jun 1954. 35p Available from Engineering Experiment Station, University of Kentucky, Lexington, Ky. PB 114878

University of Kentucky, College of Engineering, Publication vol. 8, no. 4.
1. Roads - Congresses 2. Pavements - Design 3. Roads, Toll 4. K EES B 32.

Method of converting heavy motor vehicle loads into equivalent design loads on the basis of maximum floor beam reactions, by Henson K. Stephenson and Kriss Cloninger, Jr. Texas. Engineering Experiment Station, College Station, Texas. Jan 1954. 179p diagrs, graphs, tables Available from Texas Engineering Experiment Station, Texas A. & M. College System, College Station, Texas. PB 114623

Cooperative investigation of bridge types by the Bureau of Public Roads and the Texas Engineering Experiment Station.
1. Motor vehicles - Loads - Calculation 2. Bridges - Load distribution 3. Trucks - Loads 4. TU EES B 135.

Roadside development. Report of committee presented at the 33d annual meeting, Jan 12-15, 1954. Highway Research Board. 1954. 82p photos, drawings, diagr, graphs, tables Available from Highway Research Board, 2101 Constitution Ave., N. W., Washington 25, D. C. $1.35. PB 114888

1. Roads - Roadside development 2. Roads - Shoulders 3. Soil erosion - Control 4. Trees - Roadside planting 5. NRC 318.

Sealing of joints in concrete canal linings, with special reference to the Kiewa hydroelectric project, by B. M. Holmes. Australia. Commonwealth Scientific and Industrial Research Organization. Division of Building Research. 1954. 31p photos, drawings, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114832

1. Compounds, Sealing - Australia 2. Joints, Concrete - Sealing - Australia 3. Pavements, Concrete - Joints - Sealing - Australia 4. Canals, Concrete - Joints - Sealing - Australia 5. Kiewa hydroelectric project 6. AUS CSIR BR TP 1.

Stabilized turf shoulders. Concluding report of Special Task Committee, presented at the 33d annual meeting, Jan 12-15, 1954. Highway Research Board. 1954. 18p photo, map, tables Available from Highway Research Board, 2101 Constitution Ave., N. W., Washington 25, D. C. $.30. PB 114877

1. Turf - Growth 2. Roads - Shoulders 3. Roads - Construction 4. HRB SR 19 5. NRC 320.

INSTRUMENTS

Alarm, carbon monoxide, automatic, E23, by William C. Johnson, Joseph M. Rochkind, and Russell E. Pierson. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Mar 1954. 54p photos, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25. D. C. $1.00. PB 111444

Project 4-08-06-014. Final engineering test no. 38. 1. E23 (Carbon monoxide alarm) 2. Indicators, Carbon monoxide - Tests 3. CC CRL R 302.

Coding for the Bell relay computers, model 5, by M. Masincup. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1953. 42p photos, diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114737

This report describes the Bell Relay Computers, and explains briefly coding techniques for the machines. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL M725.

Crash-shock-absorber link for airborne equipment, by Charles E. Crede and Richard D. Cavanaugh. Barry Corporation, Watertown, Mass. Mar 1954. 42p photos, drawings, diagrs, graphs (1 fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114927

Data on the final prototype model of a crash shock absorber link development are presented. The various elements of the device are described, and an analysis is presented of an extendible element with energy absorption capacity. Results are presented as static force-deflection curves of the yielding spring and as oscillograms of acceleration as a function of time. Experimentally determined results are compared with the results of a theoretical analysis. Contract no. AF 33(600)-23113, RDO no. 111-27. Appendix: Analysis of yielding helical tension spring. AAF WADC TR 54-154

Development of a step-type wave recorder, by William H. Clayton. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Dec 1953. 17p photos, drawings, diagrs, graphs (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114139

Project 30. Technical report no. 30-1. Contract N7onr-48704, Project NR 083-071. Research conducted through the Texas A. & M. Research Foundation in cooperation with the Gulf Coast Producing Division of the Pure Oil Company.
1. Waves, Ocean - Measuring equipment 2. Waves, Ocean - Photographic analysis 3. Gages, Pressure - Recording - Design.

Effects of sandblasting, hydrogen annealing and ceramic coating on chromel alumel thermocouples, by J. L. Pentecost, W. J. Plankenhorn, D. G. Bennett. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Sep 1953. 32p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114876

An investigation was made to determine the relative effects of sandblasting, hydrogen annealing and ceramic coating on the thermoelectric properties of 22 gage chromel vs alumel thermocouples. Contract no. AF W33-038-ac-14520, RDO no. 506-67. AAF WADC TR 53-424.

Electrical simulator for an hydraulic servomechanism, by Lawrence Allen Tate. Mar 1952. 38p photo, diagrs (part fold), graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114422

The design of an electrical simulator adapted to the study of a certain type of hydraulic servomechanism is presented. Construction details are given, and the use of the simulator is illustrated by the study of two forms of the servomechanism. Thesis - Purdue University.

Experimental investigation of optimum inclosure for "O" section synthetic rubber seal ring, by D. E. Gerberich, D. Kurtovich, D. E. Peterson, G. L. Pigman, O. E. Teichmann. Armour Research Foundation, Chicago, Ill. Aug 1953. 34p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114924

In an investigation conducted to determine the optimum inclosure design for "O" section synthetic rubber seal rings used in aircraft fuel systems, various types of inclosure shapes were investigated in static and dynamic application using different commercial synthetic rubber compounds. Results of the tests are presented in this report, together with recommended specifications for inclosure design. Contract no. AF 33(038)-26613, RDO no. 533-106A. AAF WADC TR 53-319.

Fringes with heterochromatic light, by D. B. Sleator. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. May 1953. 14p photos Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114735

A method is described for producing a large number of white light fringes in a Mach-Zehnder interferometer by passing one beam through a dispersing prism. It is shown that the fringe spacing can be made equal for any two wavelengths. Formulas are given for the number of fringes that can be produced with a continuous band of wavelengths. The effect of a region of disturbed gas which shifts the fringes is considered and application to the study of gas flows is discussed. Photographs of the fringe patterns are shown. Project TB3-0108J. APG BRL M 683.

Impedance-match indicating devices, by H. W. Merchant and T. J. Rauen. U. S. Naval Research Laboratory. May 1954. 13p photos, drawing, diagr, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111439

Experimental models of 3 units have been built and tested: 1) relative to a 50-ohm coaxial transmission line; 2) relative to balanced lines of 600-ohm impedance and to coaxial lines of 72-ohm impedance; and 3) for the low-frequency band that will operate with 72-ohm coaxial lines. NRL R 4375.

Instruction book for VE indicator, Navy type CAY-55 ADV, Navy type CAY-55 ADV-1 and for VE-1 indicator, Navy type CAY-55 AGD (Westinghouse Electric Corporation, Industrial Electronics Division, Baltimore, Md.) U. S. Bureau of Ships. Jul 1945. 163p photos, drawings (1 fold), diagrs (part fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.50, Photocopy $21.50. PB 114622

Contract NXsr-33184.
1. Radar - Indicators 2. Radar, PPI 3. CAY-55 ADV (Indicator) 4. CAY-55 ADV-1 (Indicator) 5. CAY-55 AGD (Indicator) 6. NAVSHIPS 375.

Interferometric studies of nozzle flow. Part I: Description of method and test equipment, by E. W. Price. U. S. Naval Ordnance Test Station, Inyokern, Calif. Sep 1949. 46p photos, drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114617

Facilities have been established for flash photography of air flow in jets and transparent nozzles, using a four-plate interferometer of 3-in. field to obtain density measurements. Results of initial tests are presented in the form of photographs obtained with a comparatively small, low-pressure (80 psi), two-dimensional nozzle. Light sources and cameras are described and discussed. A new treatment of the theory of the four-plate interferometer is presented, as well as a brief description of the application of interferrometric data to the problem of gas flow studies. NAVORD 1182, Part 1. NOTS 238.

Investigation of microbarometric oscillations in Eastern Massachusetts, by E. A. Flauraud, A. H. Mears, F. A. Crowley, Jr., A. P. Crary. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Terrestrial Sciences Laboratory, Cambridge, Mass. May 1954. 70p photos, diagrs, graphs (part fold), map, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. Limited supply available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111503

The instruments used in a study of microbarometric oscillations of from 5- to 100-min periods and from 0.05- to 1-mb double amplitudes are described. A method of obtaining an index of microbarometric activity is presented and the results of a year-long twelve-hourly index determination are described. A description is given of methods for cross-correlating microbarograms from different stations of the nonlinear arrays used for the determination of the pressure wave velocities. AAF GRD P 27. AAF CRC TR 54-11.

Multichannel UHF crystal oscillator, by Alwin Hahnel. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Dec 1953. 17p photo, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114774

A uhf oscillator circuit is described which gives crystal controlled output at a multiplicity of frequencies. This oscillator is simultaneously self-excited at two widely separated frequencies. Its output consists of a spectrum of harmonically related frequencies whose amplitude envelope can be peaked at the desired frequency. Dept. of the Army project no. 3-99-12-021. Signal Corps project no. 132A. SCEL TM M-1548.

Multicounter, a new chronograph, by H. G. McGuire and K. A. Yamakawa. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Dec 1953. 22p photos, diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114757

A chronograph which is capable of recording a large number of successive time intervals or events-per-unit time is described. The essential elements of the instrument are briefly described with reference to a block diagram. A prototype designed to operate at 100 kc has been constructed and is discussed in detail. The results of the tests that have been made are given. Limitations of the model as to operating frequency and range are shown and the steps necessary to extend the range and the frequency into the megacycle region are outlined. Dept. of the Army project no. 503-02-001. ORD project no. TB 3-0110X. APG BRL R 891.

Nozzle characteristics in high-vacuum flows: Rarefied gas dynamics, by R. G. Folsom. California. University. Institute of Engineering Research, Berkeley, Calif. Sep 1952. 5p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114863

Report no. HE-150-102. Contract N7-onr-295, Task 3, Project NR 061-003: Fluid flow and heat transfer at low pressures and temperatures. Paper presented at the annual meeting of the American Society of Mechanical Engineers, Atlantic City, Nov 25-28, 1951. Reprinted from Transactions of the ASME for Aug 1952, p. 915-918.
1. Gas flow - Measuring equipment 2. Flow, Compressible - Measurement 3. Nozzles, Fluid flow 4. UC IER Ser 20, Issue 90.

ORDVAC floating binary system, by B. Keith Betz. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1953. 47p diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114739

Dept. of the Army project no. 503-05-011. ORD project no. TB 3-0240.
1. Computers, Binary - Coding 2. ORDVAC (Computer) 3. APG BRL M 733.

Precision film type variable resistors. Final report, period Jan 8, 1953 to Oct 8, 1953, under Contract no. AF 33(600)-22244, by Lawrence B. Krauss and Irving G. Patterson. Fairchild Camera and Instrument Corporation. Potentiometer Division, Hicksville, N. Y. Oct 1953. 87p photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114835

This report discusses research investigations into and development of resistance films composed of noble metals and/or other materials to a precision goal resulting in the selection of the films exhibiting the most suitable stability and electrical characteristics for incorporation into linear and nonlinear, i.e. Sinecosine, precision variable film type resistors. Report no. 8128. Continues work done under Signal Corps Contract no. DA 36-029-sc-5568.

Pulse integrator for measuring intensity of turbulence by salt diffusion method, by Walter J. Charow. Worcester Polytechnic Institute. Alden Hydraulic Laboratory, Worcester, Mass. Apr 1952. 13p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114890

This investigation was a preliminary survey to determine suitable instruments for the measurement of turbulence by the diffusion of an electrolyte. Contract N9onr 89200, Report for period Sep 1949 to Oct 1950.

Quantum mechanical model for use by SEAC in the calculation of chemical transition probabilities, by A. M. Peiser and S. Golden. Hydrocarbon Research, Inc., New York, N. Y. Feb 1953. 19p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114840

The present work involves an experimental and theoretical study of hydrogen-oxygen flames. Contract N-onr-737, Project NR-019-129.

Quarterly progress report, Jan-Mar 1954, by R. H. Bolt and R. D. Fay. Massachusetts Institute of Technology. Acoustics Laboratory. Mar 1954. 36p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114839

1. Acoustics - Research 2. Atmosphere - Sound absorption 3. Recorders, Magnetic 4. Repeaters, Magnetic tape 5. Analyzers, Speech.

Selektive sauerstoffbestimmung in kleinen gasmengen, ein neues direkt anzeigendes gerät (Selective determination of oxygen in small quantities of gas, a new direct indicating instrument), by Karl Kordesch and Adolf Marko. Translated and edited by F. A. Raven. Mar 1954. 10p drawings, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 113861s

From Microchemie und Mikrochimica Acta, vol. 36/37, 1951, p. 420-424.
1. Oxygen meters - Austria 2. Oxygen - Determination - Austria 3. NAVSHIPS T 551, Part 2 4. STS 187b.

Simple low-inertia anemometer of the three-cup type, by A. Richard Kassander, Jr., Robert M. Stewart, Jr., Harold Falk. Iowa State College. Dept. of Physics, Ames, Iowa. Apr 1954. 34p

photos, drawing, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114713

This report describes the development, testing, and use of a three-cup type anemometer, the cup-wheel assembly of which is constructed of "ping-pong" balls. The anemometer has certain superior qualities with respect to ease of construction, ease of recording, low starting speed, and rapid response. With certain simple modifications it should be considered as a general purpose micrometeorological research tool. Contract no. AF 19(122)-440. Scientific report no. 3.

Single crystal multi-channel oscillator, by Lyle R. Battersby and E. A. Conover. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Mar 1954. 14p photos, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114776

A single crystal oscillator which provides a multiplicity of 1 mc spaced r.f. channels in the frequency range of 20 to 30 mc is described. With the addition of one stage of amplification it provides adjacent channel selectivity in the order of 50 decibels and output of approximately 3 volts across a 50 ohm load. Dept. of the Army project no. 3-99-12-021. Signal Corps project no. 132A. SCEL TM M-1567.

Some effects of exposure to exhaust-gas streams on emittance and thermoelectric power of bare-wire platinum rhodium - platinum thermocouples, by George E. Glawe and Charles E. Shepard. U. S. National Advisory Committee for Aeronautics. Aug 1954. 30p photos, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114981

Thermocouples were exposed to exhaust gases from the combustion of propane, 72-octane gasoline, and JP-4 fuel. The emissivity of a clean platinum rhodium - platinum thermocouple was approximately 0.2 in the temperature range investigated, while the emittance of an exposed thermocouple coated with exhaust residue was about 0.5. The exposure caused negligible change in the thermoelectric power of the thermocouples. NACA TN 3253.

Statistical properties of the vertical flux and kinetic energy at 100 meters. Final report under Contract no. AF 19(604)-166, by Isaac Van der Hoven and H. A. Panofsky. Pennsylvania State University. Mineral Industries Experiment Station. Dept. of Meteorology. Jan 1954. 114p diagr, map, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.00, Photocopy $15.25. PB 114773

This report describes the spectral distributions of turbulent energy and stress at 23 m, 46 m, and 91 m, as well as the relations between energy and stress with mean wind speed, radiation, lapse rate and height. For Report no. 2 see PB 112644.

Studies and investigations of a 100 watt CW X-band klystron. Period report no. 7, Jan 1-Mar 31, 1954, under Contract no. AF 19(604)-454, by G. A. Espersen, R. A. LaPlante, J. W. Rogers. Philips Laboratories, Inc., Irvington-on-Hudson, N. Y. Mar 1954. 15p diagr, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114494

Noise measurements were made on seven Philips PKX-2 klystrons and three magnetrons. Several of the klystrons having various construction features were tested under different conditions of operations. The results of the measurements are indicated in Table I and the Figures 21, 22, 23. Case 3480.

Telemetering limiter for AFCRC Aerobee beacon system, by D. G. Dow. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Dec 1953. 11p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114758

Project 2096. Technical note no. CT-1. Contract AF 19(604)-545.
1. Telemetering, Rocket - Equipment 2. Limiters, Telemetering - Design 3. Aerobee (Rocket).

MACHINERY

Development of power ice coring rig. U. S. Army. Corps of Engineers. New England Division. Arctic Construction and Frost Effects Laboratory, Boston, Mass. Mar 1954. 65p photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114837

Investigation of construction and maintenance of airdromes on ice, fiscal year 1954.
1. Ice - Cutting machinery - Design.

Dynamics and lubrication of a miniature turbine rotor on plain journal bearings, by George Sines. California. University. Dept. of Engineering, Los Angeles, Calif. Jun 1952. 65p photos, drawing, diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114818

The miniature test turbine was designed to investigate the lubrication and dynamic action of the shaft of a free rotor within the bearing clearance. An optical apparatus was made to permit visual observation and photographic recording of the time-position history of the shaft center under stationary, vibratory, and transient behavior. Several different mechanisms of lubrication were identified at the various speeds. The conditions for the onset of this mode of motion are discussed. Contract N6onr-275, Task order V, Final report. UC DE R 52-13.

Effect of rotor speed upon the effectiveness of cooling a radial flow turbine with air, by E. N. Petrick and D. W. Craft. Purdue University. Gas Turbine Laboratory, Lafayette, Ind. Nov 1953. 59p photos, drawing, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114721

Report no. I-53-1. Contract N7onr-39415, Interim report no. 1.
1. Turbines, Radial flow - Cooling - Effect of rotor speed.

Free-piston gas generator, a thermodynamic analysis, by A. K. Oppenheim and A. L. London. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Second printing. Nov 1950. 160p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.25, Photocopy $20.25. PB 114803

First printing, February 15, 1950. Technical report FP-1 under Contract N6-ONR-251, Task Order 6 (NR-035-104).
1. Generators, Gas - Thermodynamic analysis 2. Generators, Gas - Design 3. Generators, Gas - Performance 4. Generators, Gas - Tests 5. SU ME TR FP-1.

Increased production, reduced costs through a better understanding of the machining process and control of materials, tools and machines, volume 3, by James Van Voast. Curtiss-Wright Corporation, Wood-Ridge, N. J. 1954. 154p photos, graphs, tables Available from Curtiss-Wright Corp., Wood-Ridge, N. J. $4.60. PB 114635

For vols. 1-2 see PB 104549 and 106657. Contract AF 33-038-9948.
1. Titanium - Properties 2. Titanium - Metallography 3. Titanium - Machinability 4. Titanium - Microstructure 5. Titanium alloys - Machinability 6. Tools, Machine - Operation.

Stationary rig experiments on the heat extracting power of closed thermosyphon cooling holes, by H. W. Hahnemann. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1951. 43p drawings, graphs (2 fold), tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 114950

Cover date is 1954. S. O. code no. 23-9007-52. Memorandum no. M.128.
1. Turbines, Gas - Blades - Cooling - Gt. Brit. 2. Turbines, Gas - Blades - Temperature - Gt. Brit. 3. Heat - Transference - Theory 4. Thermosiphons, Closed - Cooling holes - Gt. Brit. 5. Cooling, Internal - Methods - Gt. Brit. 6. Prandtl number - Effect - Gt. Brit. 7. ARC CP 152.

Tests for creative ability in machine design. Annual report under Contract Nonr-530(02), by C. F. Schumacher, G. R. Maxson, H. Martinek. Iowa State College. Ames Laboratory. Nov 1953. 27p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114720

1. Ability tests 2. Design, Mechanical.

Theoretical and experimental investigations of axial flow compressors. Summary report under Navy Contract N6-ori-102, Task order IV, by John T. Bowen, Rolf H. Sabersky, W. Duncan Rannie. California Institute of Technology. Mechanical Engineering Laboratory, Pasadena, Calif. Jan 1949. 291p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.25, Photocopy $37.75. PB 114845

A new theory of perfect fluid flow in axial turbomachines is developed in a form that should prove very useful for design purposes. Comparisons are made between the theory and experiments on a test compressor. The experimental equipment and methods of testing are described in considerable detail. An analysis of some of the more important real fluid effects is made and compared with measurements. For Part II see PB 105051.

MEDICAL RESEARCH AND PRACTICE

Changes in the proteolytic and antiproteolytic activity of the blood serum in man and animals following exposure to X-rays, by Kenneth L. Burdon and Rufus K. Guthrie. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Feb 1954. 29p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114795

A profound and prolonged disturbances in the normal levels of serum proteolytic and antiproteolytic activity occurs after exposure to x-radiation in both humans and guinea pigs. This is discussed, in relation to: (1) the relative protection afforded against radiation damage by preradiation injection of various humoral agents, (2) the beneficial effects of suitable doses of x-radiation in allergic and infectious states, and (3) the alterations in the normal bactericidal power of the blood following exposures to whole body x-radiation. Contract AF 33(038)-15985. AAF SAM Proj 21-3501-0004, Report no. 4.

Discussion on the maintenance of cultures by freeze drying. Gt. Brit. British Commonwealth of Nations Scientific Liaison Offices. 1954. 52p photo, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 114946

S. O. code no. 88-1311.
1. Bacteria - Culture media - Freezing - Gt. Brit.

Effects of acclimatization to hypoxia on the hemoglobin molecule. A: Development and proof of techniques, by Donald D. Van Fossan. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1954. 8p graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114588

By use of the aluminum oxide column hemoglobin of both adult and fetus has been fractionated into three distinct components. The separated components were tested for electrophoretic mobility, resistance to alkali, and peroxidase activity. AAF SAM Proj 21-1201-0013, Report no. 7.

METALS AND METAL PRODUCTS

Analysis of thorium-aluminum alloys, by G. W. C. Milner, J. L. Woodhead. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Apr 1954. 10p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 114886

HD. 1189. S. O. code no. 70-474-1-66.
1. Aluminum-thorium alloys - Analysis - Gt. Brit. 2. Atomic power - Research - Gt. Brit. 3. AERE C/R 1400.

Beta ray ionization intensity of potassium, uranium and thorium, by V. F. Hess, R. I. Weller, and W. D. Parkinson. Fordham University. Dept. of Physics, New York, N. Y. Dec 1953. 61p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114684

A detailed description is presented of a study of the absolute intensity of the beta ray ionization from naturally radioactive potassium salts, and uranium and thorium ores. Scientific report no. 3. Contract no. AF 19(122)-409.

Corrosion tests of metals and ceramics, by the staff of the Division of Chemical Engineering, compiled by L. D. Yates. U. S. Tennessee Valley Authority. 1951. 63p photos, drawings, diagr, tables Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $.20. PB 114413

This report is a compilation of comparative corrosion rates of many commercial metals and ceramic materials in reagents such as mineral acids and salt solutions. Tests were made in phosphoric and nitric acids, fluorine compounds, acidified magnesium chloride, copper ammonium acetate, and ammonium nitrate. Chemical Engineering Report no. 9.

Delayed-yield time effect in mild steel under oscillatory axial loads, by R. O. Belsheim. U. S. Naval Research Laboratory. Mar 1954. 39p photo, drawings, diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.50. PB 111410

A new dynamic-loading apparatus, which supplies both oscillatory and static axial loads to a test specimen, was developed. This equipment was used to investigate the behavior of mild steel loaded by various combinations of static and vibratory loads. Thesis - Purdue University. NRL R 4312.

Diffusion of cobalt, iron and nickel into titanium carbide. Summary report, Oct 1950-Jan 1952, under Contract no. AF 33(038)-16190, by Robert C. Turnbull and W. G. Lawrence. New York State College of Ceramics, Alfred, N. Y. Jan 1952. 7p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114896

1. Titanium carbides - Analysis 2. Cobalt - Determination 3. Iron - Determination 4. Nickel - Determination 5. Diffusion, Thermal 6. Tracers, Radioactive - Metals.

Ductile fracture of metals: Mechanical anisotropy in the SAE 4340 steel, by Davis S. Fields, Jr., Walter A. Backofen, John Wulff. Massachusetts Institute of Technology. Dept. of Metallurgy. Metals Processing Division. Sep 1953. 29p photos, diagr, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111423

The tensile fracture characteristics after various amounts of torsional prestrain have been studied in specimens of SAE 4340 steel of three grades: vacuum-melted, aircraft quality, and commercial quality. Contract N5ori-07841, Project no. NR 031-356. Technical report no. 4.

Effect of dispersions on mechanical properties, by John E. Dorn and C. Dean Starr. California. University. Institute of Engineering Research, Berkeley, Calif. Nov 1953. 42p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114678

A brief summary of the dependence of properties on the microstructures of polyphase alloys are presented in this review. Contract N7-onr-295, Task order II, NR-031-048, Thirty-third technical report. UC IER ser. 22, No. 33.

Equilibrium constants for the formation of complexes between metal ions and amines containing sulfur, by Ely Gonick, W. Conard Fernelius and Bodie C. Douglas. Pennsylvania State College. Dept. of Chemistry, State College, Pa. Oct 1953. 25p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114294

The formation constants have been determined for

complexes of copper, nickel, cobalt, zinc and silver ions with methyl 2-aminoethyl sulfide, bis(2-aminoethyl) sulfide, 1,8-diamino-3,6-dithiaoctane and 2-aminoethanethiol at 30°. Formation constants were determined at 0° and 50° for complexes of nickel with the ligands listed and for complexes of all of the metals studied with bis(2-aminoethyl) sulfide. The sulfur-containing amines give less stable complexes than the analagous polyamines containing no sulfur, except for 2-aminoethanethiol which coordinates as a negative ion to give very stable compounds and for bis(2-aminoethyl) sulfide with silver ion. Contract N6onr 26913. Based on a thesis presented by Ely Gonick, Aug 1951.

Free surface motion induced by shock waves in steel, by William A. Allen. U. S. Naval Ordnance Test Station, Inyokern, Calif. Mar 1953. 27p photo, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114828

Data obtained from the four 1025 steel specimens, and data obtained from two additional specimens, have been analyzed partially. Results are compared with predictions from the theory of elasticity for the case of a diverging pulse. NOTS TM 984.

Fundamental properties of organic finishes. Final report under Contract N5-ori-111, Task order V, by B. G. Brand, E. R. Mueller, E. E. McSweeney, A. E. Austin, C. M. Schwartz, and H. R. Nelson. Battelle Memorial Institute, Columbus, Ohio. Apr 1949. 10p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 111463

Electron diffraction, electron microscopy, and X-ray diffraction were employed in this investigation. The objectives were to obtain information concerning the internal structure of organic finishes and the interfacial properties of both the finishes and the metal surfaces to which they are applied.

Heat transfer to liquid metals, by Frederick B. Kacena, W. Francis Lindell, Edward C. Lawson, Jr. Delaware. University. Dept. of Mechanical Engineering, Newark, Del. Apr 1952. 68p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114823

The purpose of this investigation was to determine free convection heat transfer coefficients between a horizontal heated tube and a bath of lead-bismuth eutectic alloy. Report no. ME-T-2. Contract N8onr-74002.

Investigation of nickel-aluminum alloys containing from 14 to 34 percent aluminum, by W. A. Maxwell and E. M. Grala. U. S. National Advisory Committee for Aeronautics. Aug 1954. 42p photos, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114982

The melting practice developed was most important for the preparation of sound bodies. Room- and elevated-temperature strengths, ductilities, and susceptabilities to hot-rolling were determined. Creep-rupture strength at 1350° F, impact resistance, and effects of thermal treatment on microstructure were determined for the 17.5-percent-aluminum alloy, which had the most outstanding properties. NACA TN 3259.

Report on nickel-beryllium alloys, by F. M. Walters. U. S. Naval Research Laboratory. Jul 1940. 18p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114796

The tensile properties of six experimental nickel-beryllium alloys were determined for several heat treatments and the values found were equal to those appearing in the literature. Since nickel-beryllium alloys owe their strength to precipitation hardening, the limitations peculiar to such alloys are discussed. NRL M-1633.

Scabbing of metals under explosive attack: Multiple scabbing, by John S. Rinehart. U. S. Naval Ordnance Test Station, Inyokern, Calif. May 1952. 31p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114824

Further quantitative data bearing on the scabbing of metals under explosive attack are presented in this paper. In particular, the mechanics of the generation of multiple scabs is established. Experimental data have been obtained that show that multiple scabbing will occur whenever the maximum stress σ_0 in the transient wave that impinges on a free surface is more than double the critical normal fracture stress σ_c of the material. NOTS TM 348.

Selected industrial films: Sheet metal work, a list and description of films available to business from industrial, commercial, and government sources. U. S. Office of Technical Services. Jul 1954. 12p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 111427

1. Sheet metal - Motion pictures - Bibliography
2. Motion pictures, Educational - Bibliography
3. OTS SIF 13.

X-ray diffraction and vapor pressure investigation of the rhenium-germanium phase diagram, by Alan W. Searcy, Robert A. McNees, Jr., and John M. Criscione. Purdue University. Dept. of Chemistry, Lafayette, Ind. Oct 1953. 15p diagr, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114291

An X-ray diffraction and vapor pressure investigation of the rhenium-germanium phase diagram re-

veals that one compound, $ReGe_2$, is formed. $ReGe_2$ decomposes at 1132 ± 15°C to solid rhenium and nearly pure liquid germanium. The heat of formation of $ReGe_2$ is -2.0 ± 8.0 kcal. The irregular variation in stabilities of carbon family compounds of rhenium is explained. Report no. 8 under Contract no. N7onr-394/12, Project no. NR-032-331: Preparation and properties of refractory compounds of silicon and germanium. Taken in part from a Ph.D. thesis of R. A. McNees, Jr.

X-ray diffraction study of steel and copper samples fractured by explosive loading, by D. Rosenthal and M. Kaufman. California. University. Dept. of Engineering, Los Angeles, Calif. Feb 1952. 14p photos, diagr, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114889

The diagrams revealed considerable line broadening not only in the region of shear fracture but also in the region of cleavage fracture. This line broadening was interpreted as an evidence of plastic deformation preceding fracture. In addition to line broadening one determination of the residual stress was made in the cleavage fractured area of a steel fragment, but the residual stress was found to be small.

METEOROLOGY AND CLIMATOLOGY

Comment on the solar granulation, by Richard N. Thomas. Harvard University. Harvard College Observatory. Solar Dept. Jan 1954. 13p graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114375

The interpretation of the Frenkiel-Richardson-Schwarzschild granulation studies is discussed. It is concluded that the 15000km pattern shown by the velocity correlation analysis establishes the existence of a convection pattern with this characteristic diameter. It is suggested that the granules themselves are sound waves, and the limitation in observed granule size reflects the atmospheric acoustic opacity. Contract AF 19(604)-146. HU HCO SR 16.

Dissociation of molecular oxygen in the high atmosphere, by M. Nicolet and P. Mange. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Feb 1954. 66p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114376

A complete set of data is presented for the dissociation of molecular oxygen caused by absorption of solar radiation. The importance of the level of solar emission is explicitly shown. A very low rate coefficient of dissociation is obtained indicating that a departure from photoequilibrium exists in the thermosphere. Contract no. AF 19(122)-44. PSC IRL SR 56.

Drop-size distribution and visibility in clouds and rain, by Shepard Bartnoff. Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. May 1954. 23p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114625

Contract No. AF 19(604)-550, Scientific report no. 1.
1. Raindrops - Size - Distribution 2. Raindrops - Visibility.

Fluctuations of starlight and skylight. 2: Experimental verification of a recently proposed theory of astronomical seeing, by Geoffrey Keller and Robert H. Hardie. Ohio State University Research Foundation, Columbus, Ohio. May 1953. 22p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114714

A recently proposed theory of astronomical "seeing" has been developed in a number of particulars and then subjected to a series of laboratory tests. An artificial star was employed for these tests and turbulence was produced under controlled conditions. Within the precision of the measurements, the experimental results are all in agreement with the theory. Contract AF 19(604)-41. For Part 1 see PB 112374. AAF CRC TR 54-8. AAF CRL E 5116.

Investigation into the relationship between 500-mb parameters and synchronous surface weather, by Albert Miller, Robert C. Curtis, Charles A. Weintraub. Pennsylvania State University. Mineral Industries Experiment Station, Dept. of Meteorology. Jun 1954. 109p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.75, Photocopy $14.00. PB 114718

The purpose was to determine whether 500-mb prognostic charts--derived objectively by numerical methods--could be used in devising objective methods of forecasting surface weather. Contract no. AF 19(604)-588, Final report.

Neutral points of skylight polarization in a Rayleigh atmosphere, by Kinsell L. Coulson. California. University. Dept. of Meteorology, Los Angeles, Calif. Apr 1954. 34p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114715

Chandrasekhar's exact theory of radiative transfer in a plane parallel molecular atmosphere is used for the study of the behavior of the neutral points of skylight polarization. Selected curves of angular distance versus sun elevation are given to show the general characteristics of the neutral point behavior, and the complete computational results are given in tabular form. Contract no. AF 19(122)-239. Scientific report no. 7.

Pressure variations on Oahu Island, by Robert L. Pyle. California. University. Institute of Geophysics. Oahu Research Center. Mar 1954. 49p diagrs, graphs, map, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114707

The work is intended to lay a foundation for quick analysis of atmospheric solar tides through the use of short-period records in the tropics and to determine the effect of land relief on the diurnal pressure oscillation. Procedures and instrumentation are described in detail. Contract no. AF 19(604)-546.

Statistical properties of the vertical flux and kinetic energy at 100 meters, by H. A. Panofsky. Pennsylvania State College. Mineral Industries Experiment Station. Division of Meteorology. Jul 1953. 88p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114654

Contract no. AF 19(604)-166. Scientific report no. 2. 1. Ionosphere - Research 2. Atmosphere - Turbulence - Meteorological aspects 3. Kinetic reactions 4. Winds, Ionospheric - Measurement.

Upper atmosphere research report. XVIII: A method for determining density in the upper atmosphere during rocket flight, by R. Horowitz and D. Kleitman. U. S. Naval Research Laboratory. Oct 1953. 13p diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114748

An equation is derived which relates the density of the upper atmosphere to the change in pressure in a Philips ionization gage mounted on the side of a rolling rocket. This equation holds for any angle between the rocket axis and gage axis. If the gage is mounted normal to the rocket axis, the equation reduces to a simpler form presented previously by Havens. NRL R 4246.

Variation of rotational temperature with height in the aurora, by G. G. Shepherd and D. M. Hunten. Saskatchewan. University. Physics Dept. n.d. 25p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114374

A considerable number of auroral spectra of the negative group band N_2^+ (0,0) at 3914 A have been obtained with a scanning spectrometer. For some of these spectra, auroral heights were determined by means of double station photography. Rotational temperatures were measured from the band profiles by the usual method which is described. The results indicate an increasing rotational temperature with height through the lower auroral region. This is in qualitative agreement with the accepted kinetic temperature variation in that region. Date of publication is 1953 or 1954. Scientific report no. AR-11. Contract no. AF 19(122)-152.

Wiresonde observations during the 1952-53 winter at Eielson Air Force Base, Alaska, by Elmer Robinson and James A. MacLeod. Stanford Research Institute, Stanford, Calif. Jan 1954. 23p photos, diagrs, graph, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114712

Wiresonde observations showed a maximum inversion between 4 feet and 100 feet of over 10 degrees centigrade, but, for the 69 observations available, the median value of the temperature difference in this layer was +1.5C. Contract no. AF 19(122)-634. SRI Project no. CU-473. Report no. 12. Scientific report no. III.

Zonal wind field in the upper atmosphere, by B. Haurwitz. New York University. College of Engineering. Dept. of Meteorology and Oceanography. Feb 1954. 13p diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114369

Scientific report no. 7. Contract no. AF 19(122)-49. 1. Atmosphere - Circulation - Troposphere 2. Winds, Tropospheric - Theory.

MINERALS AND MINERAL PRODUCTS

Evaluation of some methods for the analysis of clay materials. Pennsylvania State University. College of Mineral Industries, State College, Pa. Nov 1953. 28p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114717

A number of methods were tested for their applicability to the problem of determining the content of halloysite in kaolin clays. These analytical methods included the thin section point count technique, base-exchange determinations, electron microscope techniques, and infra-red absorption spectra differences. These four techniques are evaluated with respect to accuracy and application and are compared with other reported techniques. Contracts N6onr 269, T. O. 8, NR-032-264, 265 and N6onr 269, T. O. 9, NR-081-062. Also issued as Technical report no. 9, Task order 9. Contents: Part I. Evaluation of methods for the quantitative analysis of halloysite-kaolinite clays, by L. B. Sand and W. C. Ormsby. - Part II. Base-exchange: An analytical tool for mixed-layer aggregates, by W. C. Ormsby and L. B. Sand. PSC SMI TR 55.

Limestones of Tasmania and their industrial development, by J. S. Hosking and H. V. Hueber. Australia. Commonwealth Scientific and Industrial Research Organization. Division of Building Research. 1954. 33p photos, fold map, graph, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $5.00. PB 114834

1. Limestone - Tasmania 2. Lime industry - Tasmania 3. AUS CSIR BR TP 3.

ORDNANCE AND ACCESSORIES

Compression shock due to the vertical impact of an axially symmetric body on a plane water surface, by R. H. Owens. U. S. Naval Ordnance Test Station, Inyokern, Calif. Nov 1951. 40p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114578

1. Water - Penetration - Spheres 2. Water - Pressure - Theory 3. Ballistics, Underwater - Theory 4. Shock, Compression - Theory 5. NOTS TM 581.

Construction and selection of smoothing formulas, by L. S. Dederick. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. May 1953. 53p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114727

The purpose of this report is to present a method by which two conflicting aims are more effectively reconciled than by any previously used method. APG BRL R 863.

Engravement of transient stress wave particle velocities, by John S. Rinehart and John Pearson. U. S. Naval Ordnance Test Station, Inyokern, Calif. Nov 1952. 33p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114827

A technique is described which enables quantitative determinations to be made either of particle velocity within the transient wave or of velocity of propagation of the wave. The scheme consists basically of measuring the depth of the permanent impression or engravement that is left on a surface when a pellet that has been previously affixed to that surface flies off. Considerable numerical data are presented which establish the validity of the scheme. NOTS TM 961.

ENIAC computation of two-dimensional supersonic nozzles, by Nathan Gerber. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Dec 1953. 21p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114732

A procedure based on the method of characteristics is described in detail for computing two-dimensional supersonic nozzles with continuous curvature everywhere. The results of ENIAC calculations of a series of nozzles by this method are summarized briefly. Project no. TB3-0108. Dept. of the Army project no. 503-06-004. APG BRL R 886.

Experimental technique used to measure transient waves through solids, by William A. Allen and Clyde L. McCrary. U. S. Naval Ordnance Test Station, Inyokern, Calif. Apr 1952. 31p photos, drawing, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25. D. C. Microfilm $2.50, Photocopy $5.25. PB 114825

Equations are derived that have been used in the analysis of the experimental data. Preliminary experimental results are given as an indication of the precision of the technique. NOTS TM 395.

Force ballistocardiography, by Wolf W. von Wittern. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1952. 38p photos, drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114726

This report introduces a method of compensating for the influence of the mechanical properties of the body on the ballistocardiogram. A method for the absolute calibration of this record is presented. AAF WADC TR 52-340.

Optical technique used to measure transient waves through solids, by William A. Allen and Clyde L. McCrary. U. S. Naval Ordnance Test Station, Inyokern, Calif. Nov 1952. 37p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114826

An experimental technique, based upon the principle of the optical lever, has been used to measure surface oscillations as small as 10μ in amplitude on a thick circular plate while it deforms under explosive attack. Equations are derived that have been in the analysis of the experimental data. Experimental results are given as an indication of the precision of the technique. Revision of TM 395. NOTS TM 956.

Prediction of multiple time series, by Herbert K. Weiss. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jun 1953. 10p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114728

Concise expressions are developed for the determination of the "optimum" linear predictor for multiple time series. The "optimum" is that linear predictor which minimizes the variance of prediction error. Project no. TB3-0102. APG BRL R 869.

Propagation of error in numerical integrations, by Mark Lotkin. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jul 1953. 29p graphs, tables Available from Library of Congress, Publication Board Project,

Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114729

Project TB3-0007K.
1. Equations, Differential 2. Errors - Statistical methods 3. Errors - Theory 4. APG BRL R 875.

Some polynomials associated with Tschebycheff polynomials, by A. H. Payne. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Feb 1954. 53p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114734

Four sets of polynomials associated with the Tschebycheff polynomials are defined and certain identities satisfied by them are established. The zeros of half of the polynomials are given in closed form. The class $\mathcal{H}$ of sets of polynomials including the above mentioned four sets, is defined and certain of its properties are established. Project TB3-0007K. Dept. of the Army project no. 503-06-002. APG BRL R 899.

Structure of intense shock waves, by Robert E. Street. U. S. Naval Ordnance Test Station, Inyokern, Calif. Sep 1952. 36p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114618

The relation between pressure and density in a shock wave is discussed qualitatively on the basis of the Rankine-Hugoniot equation for a diatomic gas with consideration of dissociation and ionization. Consists largely of a translation of a paper by W. Döring. NOTS TM 943.

Truncation error in the difference equation solution of Laplace's equation in a rectangular parallelopiped, by G. Springer. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1953. 14p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114731

Project TB3-0007K.
1. Laplace functions 2. Errors - Statistical methods 3. Equations, Differential 4. APG BRL R 881.

U. S. rocket ordnance development and use in World War II, released by the Joint Board on Scientific Research and Development, War Department, Navy Department. U. S. Joint Board on Scientific Information Policy. Mar 1946. 60p photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114958

1. Rockets, Airborne 2. Rockets - Development 3. Airplanes, Rocket assisted.

PAPER AND ALLIED PRODUCTS

Coordinates for log-log probability graph paper $p + q = 1$. Parke Mathematical Laboratories, Inc., Concord, Mass. Mar 1954. 14p graphs (1 fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114838

Report no. 4 under Contract no. AF 19(604)-767.
1. Tables, Mathematical 2. Paper, Graph.

PERSONNEL APTITUDE TESTING

Scientists in uniform, World War II, a report to the Deputy Director for Research and Development, Logistics Division, General Staff, U. S. Army, by D. L. Delo, with editorial assistance from Paul D. Gard. U. S. Army. General Staff. Research and Development Group. Logistics Division. 1948. 104p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.75, Photocopy $14.00. PB 114960

1. Scientists - Selection 2. Scientists - Training.

PHOTOGRAPHIC AND OPTICAL GOODS

Analytical treatment of the orientation of a photogrammetric camera, by Hellmut H. Schmid. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1953. 90p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114730

The analytical treatment of orientation and calibration of a photogrammetric camera is discussed from the point of view of the geometrical configuration as well as the least squares adjustment. The solution can be applied to measuring methods in both ground and aerial photogrammetry. The solution is suitable for electronic computing devices and is marked by its computing economy. Dept. of the Army project no. 503-06-011. ORD project no. TB 3-0538C. APG BRL R 880.

Instrument for the automatic operation of star trail recording cameras, by John C. Schmidt. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1953. 13p photos, diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114738

An instrument has been developed which will control automatically the operation of camera shutters and record the times of shutter operation. The main use of this device will be in the recording of star trails for the calibration of photogrammetric cameras. Dept. of the Army project no. 503-06-011. ORD project no. TB 3-0538. APG BRL M 732.

Measurement by timed spark shadowgraphs of shock velocities in the shock tube, by Herbert L. Hoover. Lehigh University. Institute of Research, Bethlehem, Pa. Jul 1953. 25p photo, drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114913

Using a rectangular shock tube with glass walls, shock propagation near the diaphragm has been studied quantitatively by means of double spark shadowgraphs. The cross-section of the tube had dimensions of 0.64 and 7.6 cm. For positions between 100 and 250 hydraulic radii from the diaphragm, shock velocities were measured by timing the interval between the sparks. Within this region the shock velocity is greatest at the position nearest the diaphragm, but not as large as predicted by ideal theory. Contract N7onr-39302, Project NR 061-063, Technical report 3. Thesis, covering research from June 1950 to June 1953.

PHYSICS

General

Application of the Reichardt hypothesis to the transport of momentum and mass in coaxial jets, by Arnold Kivnick. Illinois. Engineering Experiment Station, Urbana, Ill. Jun 1952. 44p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114521

A sample calculation is given to demonstrate the use of the method in predicting concentrations and velocities in the mixing region of a given coaxial jet system. Contract DA 18-064-CML-445 and Contract N6-ori-71, T. O. XI. Technical report no. CML-2. ILU EES TR CML-2.

Axisymmetric flow of an ideal incompressible fluid about a solid torus, by E. Sternberg and M. A. Sadowsky. Illinois Institute of Technology. Dept. of Mechanics. Aug 1952. 32p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114531

This paper contains an exact solution in series form to the problem presented by the irrotational, axisymmetric flow of an ideal, incompressible fluid past a solid torus of circular cross section. Contract N7-onr-32906, Project no. NR 035-302.

Bibliography on free and ducted turbulent jets, by L. G. Alexander. Illinois. Engineering Experiment Station, Urbana, Ill. Aug 1952. 29p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114568

The citations listed in this Bibliography, with few exceptions, relate to the flow taking place in jets, whether free or enclosed in ducts, under conditions such that the mixing of the jet with a secondary stream, in motion or at rest, is controlled by the turbulence generated by the jet itself. Only jets which mix homogeneously with the secondary fluid have been considered. References of a theoretical nature have been listed only if they relate specifically to "free" turbulence. Papers relating to jet ejectors, injectors, jet pumps, thrust augmentors, and mixing chambers have been included, more for the light they throw on the free turbulence problem than vice versa. Contract N6-ori-71, Task order XI. ILU EES TR 14.

Comparative study between an exact and an approximate theory of the acceleration damper, by Carl Grubin and Paul Lieber. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Jul 1951. 49p diagrs, graphs (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114472

An acceleration damper is a device for reducing the vibrations of mechanical systems through the mechanism of momentum transfer by impact and the conversion of mechanical energy into heat. In this report both an exact and an approximate theory are developed and discussed. Contract no. N6onr-26316, Project no. NR-035-327. PIB AL 188.

Cone drag in a rarefied gas flow, by D. C. Ipsen. California. University. Institute of Engineering Research, Berkeley, Calif. Aug 1953. 56p photos, drawing, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114865

The principal effort was directed toward development of a compact, remote balance satisfactory for measurement of the small forces involved. The resulting design gives sufficient accuracy for the present range of forces investigated, but extension of the investigation to lower Reynolds number may require design refinement. Report no. HE-150-114. Contract N7-onr-295, Task 3, Project NR 061-003. UC IER Ser. 20, Issue 95.

Cylinder and semicylinder in subsonic flow, by Harry H. Bingham, David K. Weimer, Wayland Griffith. Princeton University. Dept. of Physics. Jul 1952. 39p photo, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114822

Contract N6ori-105, Task II, NR 061-020. Technical report II-13.
1. Flow, Subsonic 2. Shock waves - Diffraction 3. Vortex motion 4. Cylinders - Air flow 5. Cylinders, Semi - Air flow.

Diffraction of a shock wave over a rectangular notch, by Wesley R. Smith. Princeton University. Dept. of Physics. Feb 1954. 24p photos, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114906

The average pressure vs. depth in a two dimensional notch were measured at increasing times after flow was initiated by means of shock waves. Shock strengths of $\xi = P_1/P_2 = 0.178$ and 0.754 and notch depth to width ratios of 2:1 and 4:1 were used. Contract N6ori-105, Task II, NR 061-020. Technical report II-15.

Diffraction of shock waves around obstacles and the transient loading of structures, by Walter Bleakney. Princeton University. Dept. of Physics. Mar 1950. 82p photos, drawings, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114891

Contract N6ori-105, Task II, NR 061-020. Includes The shock tube, a facility for investigations in fluid dynamics, by Walter Bleakney, D. K. Weimer, and C. H. Fletcher (Reprinted from Review of Scientific Instruments, vol. 20, no. 11, p. 807-815, Nov 1949).
1. Shock tubes - Design 2. Shock tubes - Uses 3. Shock waves - Diffraction 4. Loads, Structural - Distribution.

Effects of an oscillating torsional couple on the contact surfaces of elastic spheres, by H. Deresiewicz. Columbia University. Dept. of Civil Engineering. Feb 1953. 18p diagrs, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114515

The present paper extends the Lubkin solution to the case in which the normal force is held constant while the torsional couple, after having reached a certain value, decreases, and to the case in which the torsional couple oscillates between fixed amplitudes. Contract Nonr-266(09), Project NR-064-388. Technical report no. 5. CU-6-54-ONR-266(09)-CE.

Experimental investigation of the laws of plasticity, by Aris Phillips. Stanford University. Division of Engineering Mechanics, Stanford, Calif. Dec 1950. 20p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114537

This first report gives results of 15 experiments in combined tension and torsion of thin-cylindrical tests made of annealed pure aluminum 2S-O. It has been found that while for most tests the theory of plastic flow gives more accurate results than the theory of plastic deformation, for some tests the contrary is the case. Contract N6-onr-251, Task order 11, Project NR-035-240, First report. Technical report no. 9. SU ME TR 9.

Experimental study of boundary layer transition, prepared by H. W. Bennett, submitted by Charles A. Lee. Kimberly-Clark Corporation. Research and Development Laboratories, Neenah, Wis. Sep 1953. 69p photos, drawings, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114205

Transition on a smooth flat plate in a zero pressure gradient was studied in a wind-tunnel using conventional surface tube and hot wire techniques. The effect of free-stream turbulence on the process was studied in terms of the energy concentrated at the amplified frequency. Contract Nonr-673(00).

Generalized theory of convective heat transfer in a free-molecule flow, by A. K. Oppenheim. California. University. Institute of Engineering Research, Berkeley, Calif. Mar 1952. 24p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114810

In this report the theory of the convective heat transfer in a free-molecule flow in Maxwellian equilibrium is generalized and correlated. The results are applicable to a substance of any molecular structure and cover the range of all the extreme and simple surface shapes. Contract N7-ONR-295-Task 3, Project NR 061-003. Report no. HE-150-93. UC IER Ser. 20, Issue 81.

Group height calculations in the presence of the earth's magnetic field, by John M. Kelso. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Mar 1954. 34p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114316

Contract no. AF 19(122)-44.
1. Ionosphere - Electromagnetic effects 2. Ionosphere - Research 3. Electrons - Density - Mathematical analysis 4. PSC IRL SR 58.

Heat transfer from right circular cones to a rarefied gas in supersonic flow, by R. M. Drake, Jr. and G. J. Maslach. California. University. Institute of Engineering Research, Berkeley, Calif. Apr 1952. 28p drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114812

Contract N7-ONR-295-Task 3, Project NR 061-003. Report no. HE-150-91.
1. Heat - Transference - Theory 2. Flow, Fluid -

Theory 3. Flow, Supersonic - Heat transference 4. Cones, Circular - Heat transference 5. Gases, Rarefied - Heat transference 6. Reynolds number - Effect 7. UC IER Series 20, Issue 79.

Heat transfer from spheres to a rarefied gas in subsonic flow, by L. L. Kavanau and R. M. Drake, Jr. California. University. Institute of Engineering Research, Berkeley, Calif. Jan 1953. 22p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114864

It is the purpose of this report to present overall average heat transfer data from spheres to a rarefied air stream for a range of variables, and to present a simplified analysis which predicts the trends of this data by a rarefaction correction to the continuum solution. Report no. HE-150-108. Contract N7-onr-295-Task 3, NR-061-003. UC IER Series 20, Issue 94.

Integration of the Reynolds equations for incompressible turbulent boundary layers, by Donald Ross. Pennsylvania State College. School of Engineering. Ordnance Research Laboratory, State College, Pa. May 1953. 16p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114470

By integrating the complete Reynolds equations for two-dimensional, incompressible, turbulent boundary layers, four correction terms are found for the von Karman momentum integral equation. It is shown that, except at separation, only the correction term involving the anisotropy of the turbulence is important, and that this term is appreciable even for zero pressure gradient. By relating the anisotropy of the turbulence to the shear, an approximate expression for this correction term is developed. Additional evidence for the approximate constancy of the direction of the principal axis of the turbulent stress tensor relative to the mean direction of flow is also discussed. Contract Nord-7958. Report no. 2 under ONR Project NR062-139.

Investigation of the effect of partial suction on the flow characteristics and stability of compressible laminar boundary layers over a flat plate, by F. J. Romano. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. Aug 1950. 22p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114819

The compressible boundary layer over a flat plate with partial suction at the wall has been calculated by the Karman - Pohlhausen method for the case of heat transfer at the wall and of Prandtl number equal to unity. Approximate solutions are obtained by assuming a polynomial of the fourth degree for the velocity profiles. These solutions give the variation of the characteristics of the flow along the plate length as parametric equations. The stability rules of Lees have been applied to the velocity profiles obtained, in order to calculate approximately the effects of partial suction on the stability of the laminar boundary layer. Contract N6ori-206, T. O. I, Project NR-061-001. PIB AL 174.

Isokinetic flow and sampling, a literature review and technical background, by James D. Wilcox. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Dec 1953. 17p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 113973

Project 4-08-03-006. Special report.
1. Flow, Isokinetic 2. Flow, Isokinetic - Bibliography 3. Sampling, Isokinetic - Bibliography 4. Kinetic reactions - Measurement 5. Aerosols - Sampling - Bibliography 6. CC CRL R 147.

Laminar boundary layer of a compressible fluid passing over a curved insulated surface, by A. F. Johnson. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Aug 1953. 35p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114448

The problems involved are discussed in detail. Examples are worked out for a flat plate which is compared to the solution of Crocco and for an arbitrary pressure distribution which is compared to the solution of Flügge-Lotz and Eichelbrenner. The method gives results accurate to a few percent so long as the flow is accelerating. Technical report no. HS-5. Contract N6-onr-251, Task order VI (NR-065-104). Reproduction of a thesis submitted in June 1952. SU ME TR HS-5.

Laminar theory of the flow through a turbomachine, by Fausto G. Gravalos. Rensselaer Polytechnic Institute. Dept. of Aeronautical Engineering, Troy, N. Y. Jan 1950. 47p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114817

Contract N7-onr-336, T. O. I, NR-061-014.
1. Flow, Laminar - Theory 2. Equations of motion 3. Flow, Axially symmetric - Theory.

Linearized theory of nonstationary flow at supersonic speeds, by John W. Miles. U. S. Naval Ordnance Test Station, Inyokern, Calif. Nov 1951. 55p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114565

Starting with the basic equations of flow for a continuous medium, the linearized theory of nonstationary flow in a perfect gas at supersonic speeds is developed. Various transformations of the linearized equations, including the reduction of non-stationary-flow problems to problems in stationary flow, are considered. The determination of the response of an

airfoil to either a harmonic or step-function excitation and the reciprocal relations between these two cases are discussed. NAVORD 1930. NOTS 462.

Measurement of friction coefficients, recovery factors, and heat transfer coefficients for supersonic flow of air in a pipe, by Joseph Kaye, Joseph H. Keenan, William H. McAdams. Massachusetts Institute of Technology. Division of Industrial Cooperation. Jun 1949. 17p drawings, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114404

Measured values are presented for friction coefficients, recovery factors, and heat-transfer coefficients for a stream of air flowing through a pipe at Mach numbers ranging from 2.5 to 1.2. Contract N5ori-07805, NR-061-028. MIT DIC TR 6418-1.

Measurement of recovery factors and friction coefficients for supersonic flow of air in a tube. Massachusetts Institute of Technology. Division of Industrial Cooperation. Contract N5-ori-07805, NR-061-028. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Part I: Apparatus, data and results based on a simple one-dimensional flow model, by J. Kaye, J. H. Keenan, K. K. Klingensmith, G. M. Ketchum, and T. Y. Toong. May 1951. 39p photos, drawings, diagrs, graphs, tables Microfilm $2.50, Photocopy $5.25. PB 114593

The investigation was limited to air flowing at supersonic speeds in a round tube. The details of three experimental test combinations used to measure the adiabatic wall temperature and local state of a supersonic stream of air are presented. The calculated quantities such as the local apparent friction coefficient, recovery factor, local Mach number, etc., are obtained from the simple one-dimensional flow model for which the properties of the stream are uniform at any cross-section of the tube and boundary-layer effects are ignored. MIT DIC TR 6418-3.

Part II: Results based on a two-dimensional flow model for entrance region, by J. Kaye, T. Y. Toong, and R. H. Shoulberg. Jun 1951. 24p diagrs, graphs, table Microfilm $2.25, Photocopy $4.00. PB 114594

The calculated quantities such as the local apparent friction coefficient, recovery factor, Mach number, etc. were obtained from the simple one-dimensional flow model for which the properties of the stream are uniform at any section and boundary-layer effects are ignored. The analysis of some of the data is undertaken with the aid of a simplified two-dimensional flow model. The supersonic flow in the tube is divided into a supersonic core of variable mass with the fluid remaining in the core undergoing a reversible adiabatic change of state, and a laminar boundary layer of variable mass. MIT DIC TR 6418-4.

Method for modification of the pressure profile in a shock tube, by Donald R. White and David K. Weimer. Princeton University. Dept. of Physics. Apr 1952. 10p photos, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114905

A thin piece of sheeting suspended across a shock tube acts as a piston which may be accelerated by the incident shock and decelerated by a wire grid. The wide range of pressure profiles thus made possible should facilitate study of blast loading of structures, shock formation from a compression, and effects due to conditions within the shock front. Contract N6ori-105, Task II, NR 061-020. Technical report II-12.

On non-stationary pressure distributions about an oscillating circular cylinder in a potential flow, by Koon-Sang Wan and Paul Lieber. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Aug 1951. 51p diagrs, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.50. PB 114471

This report relates to the development of a theory for calculating the pressure distribution about streamline and non-streamline bodies oscillating in an incompressible and irrotational flow field. As a first attempt, a circular cylinder of large slenderness ratio oscillating harmonically in the plane perpendicular to the flow direction is considered. An approximate solution to this problem and an illustrative example are given. Contract no. N6onr-26316, Project no. NR-035-327. PIBAL 187.

On slow viscous flow, by George F. Carrier. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Mar 1953. 32p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114570

The work presented here is a discussion of a new linearization of the problem which is based on a conjecture rather than on any formal procedure such as a perturbation process. The analyses of several specific boundary value problems using this linearization are presented and the results are compared to those of the classical theories of Stokes and Oseen. Contract Nonr-653(00), NR-062-163. Final report.

On the axisymmetric problem of elasticity theory for a medium with transverse isotropy, by R. A. Eubanks and E. Sternberg. Illinois Institute of Technology. Dept. of Mechanics, Chicago, Ill. Jul 1953. 21p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114699

Contract N7onr-32906, Project NR 035-302.
1. Elasticity - Theory 2. Almansi's theorem
3. Lekhnitsky's stress function.

On the use of coordinate perturbations in the solution of physical problems, by Phyllis Ann Fox. Massachusetts Institute of Technology. Nov 1953. 98p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photocopy $12.75. PB 114719

This study deals with possible improvements effected in solutions to physical problems by changes in the coordinate system of the problem. In particular, perturbation solutions to the problems are investigated with a view to improving the usual solution by allowing a perturbation of the independent variables as well as of the dependent variables. Thesis - Massachusetts Institute of Technology, 1953. Contract N5ori-60, Technical report no. 1. Project DIC 6915.

Passage of shock waves over a rectangular block at various angles, by Eugene B. Turner, Alfred C. Hunting, Alan C. Kolb, supervised by Otto Laporte. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Aug 1953. 31p photos, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114814

Project M 720-4. Contract N6onr-232, T. O. IV.
1. Shock waves - Photography 2. Shock waves - Theory 3. Interferometry 4. MU ERI 53-1.

Propagation of a disturbance in a visco-elastic and visco-plastic bar, by I. N. Zverev. Jan 1951. 17p diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114681

Translated from Prikladnaia Matematika i Mekhanika, vol. 15, p. 295-302 (1950) by Graduate Division of Applied Mathematics, Brown University.
1. Equations of motion - Russia 2. Stresses - Propagation - Theory - Russia 3. Stresses - Bars - Russia 4. Wave propagation - Visco-elastic materials - Russia 5. Waves, Elastic - Propagation - Theory - Russia 6. GDAM A11-T12/16.

Pure bending of an incomplete torus, by M. A. Sadowsky and E. Sternberg. Illinois Institute of Technology. Dept. of Mechanics. May 1952. 37p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114701

An exact solution in series form is presented for the stresses and displacements in an incomplete torus of circular centerline and circular cross-section under conditions of pure bending. The solution is preceded by a formal treatment of the case in which the shape of the cross-section is arbitrary. The normal stresses acting on the circular cross-section of the torus are evaluated numerically in an illustrative example and are compared with the results of previous approximate solutions of the same problem. The adaptation of the present solution to the determination of the initial stresses in a complete torus from which a wedge-shaped portion has been removed, is indicated. Contract N7onr-32906, Project no. NR-035-302.

Quarterly progress report no. 10 on Project N5ori-07856. Massachusetts Institute of Technology. Solid-State and Molecular Theory Group. Oct 1953. 53p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114383

For reports no. 7-9 see PB 108689, 109399, 110729. Contents: 1. Wave functions for impurity levels, by J. C. Slater and G. F. Koster. - 2. An augmented plane wave method for the periodic potential problem, by J. C. Slater and M. M. Saffren. - 3. Engery relations in the augmented plane wave method, by M. M. Saffren. - 4. Energy bands in chromium, by R. H. Parmenter. - 5. Revised valence bond theory, by R. McWeeny. - 6. Antiferromagnetism, by G. W. Pratt, Jr. - 7. System of two p electrons, by R. Kikuchi. - 8. Configurational interaction applied to the hydrogen molecule, by E. Callon. - 9. The water molecule, by G. F. Koster and H. C. Schweinler. - 10. Mechanization of molecular orbital determination, by A. Meckler. - 11. Limited configuration interaction treatment of the NH_3 molecule, by H. Kaplan. - 12. Configuration interaction for the fluorine molecule, by J. H. Barrett. - 13. Nuclear electric quadruple interaction in the KCl molecule, by L. C. Allen. - 14. Scattering of neutrons by O^{16}_2, by W. H. Kleiner. - 15. Transition probabilities for X-ray emission in the transition metals, by A. J. Freeman.

Response of an elastic solid to an oscillating pressure within a cavity, by R. D. Mindlin and T. R. Kane. Columbia University. Dept. of Civil Engineering. Apr 1953. 16p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114524

A uniformly distributed normal traction, varying harmonically with time, is applied to the surface of a spherical cavity in an infinite homogeneous, isotropic, elastic solid. The response of the system is found to be similar to that usually associated with damped vibrations of bodies containing reflecting boundaries. An explanation is obtained by comparing the elastic system with a damped, simple oscillator. The same problem is then solved for a cylindrical cavity of circular section and infinite length. Contract Nonr-266(09), Project NR-064-388, Technical report no. 7.

Secondary flows in guide vane bends with some notes on the primary two-dimensional flow, by Edward Silberman. Minnesota. University. St. Anthony Falls Hydraulic Laboratory. Jan 1953. 100p photos, drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $12.75. PB 114533

The main purpose of this research was the study of the influence of secondary flows on the basic two-

dimensional flow. It is shown in the report from experimental data that the secondary flows have a negligible influence on the average deflection of the flow by the guide vanes, but they have a major influence on the energy loss. Contract N8onr-66204. Project report no. 36.

Skin friction in subsonic low density gas flow, by F. S. Sherman. California. University. Institute of Engineering Research, Berkeley, Calif. Jul 1952. 22p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114813

Contract N7-ONR-295-Task 3, Project NR 061-003. Report no. HE-150-105.
1. Airplanes - Skin - Friction 2. Flow, Subsonic - Theory 3. Plates, Flat - Frictional resistance 4. Plates, Flat - Drag 5. Reynolds number - Effect 6. Mach number - Effect 7. Gas flow - Effect of slip 8. UC IER Series 20, Issue 92.

Slant visibility, by R. Penndorf, B. Goldberg, D. Lufkin. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Physics Laboratory, Cambridge, Mass. Dec 1952. 57p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. Limited supply available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111502

This survey is an attempt to present the slant visibility problem in a form and language suitable for direct field use. The scientific background information is confined to the appendix. The survey is based on the available knowledge of background material without acquiring new information by special research investigation. AAF GRD SG 21.

Some statistical properties of gated signal plus narrow band noise, by L. C. Maximon and J. P. Ruina. Brown University. Division of Engineering, Providence, R. I. Aug 1953. 38p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114266

In this report the variance of narrow band noise plus c.w. signal after detection and gating in time is derived. The problem is solved for ideal and Gaussian filters with square law and linear detection, the latter for large predetection signal to noise ratio. Graphs of the mean deviation divided by the mean power for noise alone are given for both filters and the model, with square law detection and predetection signal to noise ratios 0, 0.5, 1, 2. Technical report no. 1. Contract Nonr-562(05).

Survey of friction coefficients, recovery factors, and heat transfer coefficients for supersonic flow, by Joseph Kaye. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. Oct 1952. 11p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114816

From a talk presented at M. I. T.'s Symposium on boundary layers, Oct 27-28, 1952.
1. Flow, Supersonic 2. Friction, Boundary 3. Heat - Transference - Coefficients.

Theoretical and experimental study of cellular convection in rotating fluids, by Paul Frenzen and Yoshinari Nakagawa. Chicago University. Hydrodynamics Laboratory. Apr 1954. 53p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114626

In this preliminary report, the theory obtained for ordinary convection is compared to results obtained in laboratory experiments with rotating cylinders of water, and the existence of the "overstable" oscillating mode is demonstrated experimentally. Several possible applications of the theoretical results to atmospheric convection are developed by means of numerical examples, including models that are consistent with the observed association of deep convection with cyclonic relative vorticity and the distribution of clouds in regularly spaced clear and cloudy areas. Contract no. AF 19(122)-160. Scientific report no. 5.

Theoretical cloud physics studies, by James E. McDonald. Iowa State College. Dept. of Physics, Ames, Iowa. Jan 1953. 114p graph, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.00, Photocopy $15.25. PB 114798

Contract Nonr 757, Task order (00), Project NR 082 093, Final report.
1. Ice crystals - Formation 2. Stratosphere - Electrical properties 3. Raoult's law 4. Raindrops - Shape 5. Raindrops - Aerodynamics 6. Clouds - Physical properties.

Thermal and creep effects in work-hardening elastic-plastic solids, by A. J. Wang and W. Prager. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Dec 1953. 8p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114932

Contract N7onr-35801, T. O. I, NR-041-032.
1. Solid solutions - Thermodynamic properties 2. Solids - Deformation 3. Solids, Elastic-plastic - Thermal properties 4. Solids, Elastic-plastic - Creep 5. Solids, Elastic-plastic - Stresses 6. Mathematical equations and solutions 7. GDAM A11-102/8.

Thermodynamic properties of air. Acoustic dispersion measurements and preparations for studies of relaxation phenomena in shock waves, by B. M.

Leadon and F. D. Werner. Minnesota. University. Institute of Technology. Dept. of Aeronautical Engineering. Rosemount Research Laboratories, Minneapolis, Minn. Jun 1952. 45p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 113393

Research report 79. Contract N6onr-24607. Report of work from Apr 10, 1950 to Jun 30, 1952. See also PB 113390 and PB 108551.
1. Sound - Dispersion 2. Shock waves - Relaxation phenomena 3. Air - Thermodynamic properties 4. Sound - Speed - Effect of pressure 5. Interferometers, Acoustic - Design.

Three-dimensional observations on the passage of shock waves over a rectangular block, by Eugene B. Turner, Alfred C. Hunting, Walter R. Johnson, supervised by Otto Laporte. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Feb 1954. 15p photo, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114815

Project 1720-4. Contract no. N6onr-232, T. O. IV. Continues work reported in PB 114814.
1. Shock waves - Photography 2. Shock waves - Diffraction 3. Interferometry, Three dimensional 4. MU ERI AFSWP-703.

Viscosity correction to impact pressure on prolate spheroid, by D. C. Ipsen. California. University. Institute of Engineering Research, Berkeley, Calif. Mar 1952. 20p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114811

The influence of viscosity on the pressure at the forward stagnation point on a prolate spheroid is estimated analytically. The results provide a possible indication of the viscous effect on a source-shaped impact probe at low Reynolds number. Contract N7-ONR-295-Task 3, Project NR 061-003. Report no. HE-150-89. UC IER Series 20, Issue 85.

Nuclear

Approximate theory of inelastic collisions, by James F. Hornig and J. O. Hirschfelder. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Oct 1953. 33p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114301

Approximate trajectories for describing the inelastic encounters between rigid diatomic molecules are described. These trajectories, together with quantum mechanical perturbation theory, are used to derive an approximate formulation of the inelastic differential scattering cross sections for such collisions. The quantum mechanical correspondence principle is used when necessary to bridge the gap between classical and quantum descriptions of the problem. Contract N7onr-28511. WIS-ONR-5.

Gamma radiation from interaction of 14-mev neutrons with various elements, by V. E. Scherrer, R. B. Theus, and W. R. Faust. U. S. Naval Research Laboratory. Jun 1953. 30p diagrs, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111462

Experiments have been performed to observe the gamma radiation produced by interaction of 14-Mev neutrons with various materials. These included carbon, oxygen, aluminum, iron, nickel, copper, cadmium, and lead. NRL R 4197.

Mean free path for shower production by high-energy pi-mesons, by Fritz E. Froehlich and Kurt Sitte. Syracuse. University. Institute of Industrial Research. Dept. of Physics, Syracuse, N. Y. 1954. 35p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114716

Scientific report no. 1 under Contract no. AF 19(604)-68.
1. Electrons - Showers 2. Mesotrons - Electron emission 3. Protons - Electron emission 4. Atomic power - Research.

Relativistic ion optics of a cylindrical electrostatic analyzer, by V. R. Honnold and W. C. Miller. University of Notre Dame. Nuclear Physics Laboratory, Notre Dame, Ind. Nov 1953. 26p diagrs, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114772

The first order relativistic ion optics of a cylindrical electrostatic analyzer are developed in section I and are compared with the theories of Herzog and Millet. The relativistic ion optics for crossed electric and magnetic fields are developed in section II. The application of these results to the Notre Dame analyzer is presented in section III. Contract N6ori-83, T. O. II, NR 024-022. Technical report no. 2.

Stochastic estimates of γ-ray spectral intensities for shallow and deep penetration, by L. A. Beach, R. B. Theus, J. D. Plawchan, and W. R. Faust. U. S. Naval Research Laboratory. Aug 1954. 20p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114961

Use of the exact physical analogue to estimate the penetration through slab and semi-infinite shields was found to yield estimates of the spectral distributions in agreement with moment calculation for penetration distances up to 4 mean free paths. For

deep penetration, several methods of biasing were studied and compared. The exponential transformation exhibited certain advantages over other bias methods and allowed estimation of spectral intensities for penetration distances as great as 18 mean free paths of the primary radiation. NRL R 4412.

Techniques for handling and using Ba^{140} as a tracer, by John W. Affleck, Harold John, and Louis V. Holroyd. Missouri. University. Dept. of Physics, Columbia, Mo. Oct 1953. 17p drawings, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111430

Some experiments on oxide coated cathodes are described in which the radioisotope Ba^{140} was used as a tracer. An oxide cathode of BaO containing Ba^{140} was used as an evaporator in a tube which contained several movable receivers on which the evaporated BaO was deposited. The present tube design permits making the activity measurements through a thin glass bubble window in the side of the tube. Technical report no. 15. Contract N7onr-292, T. O. 5, NR 074-081.

PRINTING, PUBLISHING

Selected industrial films: Printing and publishing, a list and description of films available to business from industrial, commercial, and government sources. U. S. Office of Technical Services. Aug 1954. 6p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 111380

1. Motion pictures, Educational - Bibliography 2. Printing - Motion pictures - Bibliography 3. Publishers and publishing - Motion pictures - Bibliography 4. OTS SIF 4.

PSYCHOLOGY

Assimilation of sequentially-encoded information. V: Binary-encoded materials, by Irwin Pollack. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Jan 1954. 13p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114841

This report deals with the effect of several variables upon short-time retention of binary (two-valued) encoded materials. Binary materials are of special interest because of the ease of recoding or restructuring these materials for recall. For Part IV see PB 113164. AAF HFORL TR 54-5.

Demonstration of the effects of quickening in multiple-coordinate control tasks, by H. P. Birmingham, A. Kahn, and F. V. Taylor. U. S. Naval Research Laboratory. Jun 1954. 8p photo, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114750

Present evidence shows that a man-machine system will give optimal performance only when the man is provided with instantaneous knowledge of the effects of his own motions. The process of achieving this end has been termed "quickening." The results show that a majority of the subjects were able to perform the "quickened" task perfectly the first day of the experiment. NRL R4380.

Factor analysis study of human interests, by J. P. Guilford, P. R. Christensen, N. A. Bond and Marcella A. Sutton. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. May 1953. 87p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114985

Contract no. AF 33(038)-18408, Project no. 503-001-0007, University of Southern California. 1. Psychological tests 2. Inventories 3. Factor analysis 4. AAF HRRC RB 53-11.

Factors affecting rate of apparent change in a dynamic ambiguous figure as a function of observation time, by Kenneth T. Brown. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1953. 37p drawing, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114711

The present series of experiments was conducted to develop a satisfactory method for measuring RAC and to learn more about the physiological process which causes apparent changes to occur. All findings of the present experiments support the hypothesis that the same physiological process causes both figural after-effects and apparent changes in an ambiguous figure. AAF WADC TR 53-482.

Identification of target concepts as a function of information load, by E. James Archer. Wisconsin. University, Madison, Wis. Mar 1954. 12p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114928

The major findings were (a) time to respond increases as a linear function of relevant information load, but (b) was independent of amount of irrelevant information. These were related to previous studies and differences considered. Contract no. AF 18(600)-54, RDO no. 694-49. AAF WADC TR 54-202.

Performance on a key pressing task as a function of the angular correspondence between stimulus and response elements, by Charles O. Nystrom and David A. Grant. Wisconsin. University, Madison, Wis. Jan 1954. 21p photo, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D.C. Microfilm $2.25, Photocopy $4.00. PB 114767

Contract no. AF 18(600)-54, RDO no. 694-49.
1. Psychological tests 2. Reaction (Psychology) - Testing equipment 3. Motor reactions - Measurement 4. AAF WADC TR 54-71.

Performance on a repetitive key pressing task as a function of the spatial positioning of the stimulus and response components, by Norman H. Anderson, David A. Grant, Charles O. Nystrom. Wisconsin. University, Madison, Wis. Mar 1954. 19p photo drawing, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114926

The principal results of this experiment were as follows: (1) The optimal arrangement was obtained when both units were in front of the subject. (2) Response times were 15% to 35% greater when the stimulus and response units were on opposite sides of the subject (15% greater with the self paced procedure, 35% greater with the automatic paced procedure). Contract no. AF 18(600)-54, RDO no. 694-49. AAF WADC TR 54-76.

Short-time processing of information, by W. H. Sumby and Irwin Pollack. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Jan 1954. 15p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114842

This report considers the reproduction of artificial language materials which approach, to various degrees of statistical approximation, everyday English. It is essentially methodological and will be of interest primarily to the research worker. AAF HFORL TR 54-6.

Some behavioral implications of information theory, by G. K. Krulee and E. J. Sinclair. U. S. Naval Research Laboratory. Feb 1953. 12p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114723

Four experiments on the ability of subjects to sort cards into categories were completed, and the various tasks performed were analyzed in terms of information theory. NRL R 4119.

Use of a joy stick in making settings on a simulated scope face, by William Leroy Jenkins and A. Charles Karr. Lehigh University. Institute of Research, Bethlehem, Pa. Mar 1954. 10p diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114768

Contract AF 18(600)-24, RDO no. 694-17.
1. Psychological tests 2. Reaction (Psychology) - Testing equipment 3. Motor reactions - Measurement 4. Controls - Design 5. AAF WADC TR 53-430.

Visual discrimination of velocity as a function of stimulus duration and luminance, by Robert H. Brown. U. S. Naval Research Laboratory. May 1954. 11p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114722

In this experiment four observers discriminated velocity at eight speeds for each of eight exposure times. The minimal luminance required for the discrimination was determined for each condition. NRL R 4372.

RUBBER AND RUBBER PRODUCTS

Development and standardization of test methods for evaluating rubber. Report no. 4: Hardness measurement of rubber at low temperatures, by R. E. Ofner. U. S. Arsenal, Rock Island, Ill. Apr 1954. 32p photo, drawing, graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114708

Performance characteristics of several hardness testers were developed. These were to measure the hardness of rubber compounds over a temperature range of -65°F to room temperature. Eight compounds were tested and six hardness testers utilized. A new tester was developed which has interesting possibilities. Project no. TB4-521E. Dept. of the Army project no. 593-15-008. RIAL R 54-1547.

Electrostatic dissipation by electrically conductive rubber, by Paul M. Rogers. U. S. Arsenal, Rock Island, Ill. Mar 1954. 29p photo, graph, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111414

Project no. TB 4-521E. Dept. of the Army project no. 593-15-008. Report no. 3.
1. Rubber - Physical properties 2. Rubber - Electrical properties 3. Carbon black - Electrical properties 4. RIAL R 54-1042.

STRUCTURAL ENGINEERING

Analysis and design of structures subjected to dynamic loading, a paper presented at M. I. T. Con-

ference on Building in the Atomic Age, by N. M. Newmark. Revised. Jul 1952. 52p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114520

This paper is concerned primarily with the dynamic behavior of structures subjected to forces arising from blast. Particular attention is given to methods of analysis which are rapid enough for use in making quick estimates of structural behavior.

Analysis of the stability and ultimate bending strength of multiweb beams with formed-channel webs, by Joseph W. Semonian and Roger A. Anderson. U. S. National Advisory Committee for Aeronautics. Aug 1954. 28p photos, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114997

The theory is compared with test data for multiweb beams in bending and a criterion is given for predicting whether a given beam will be susceptible to a wrinkling instability or will buckle in a local mode. The specification for riveting the web attachment flanges to the cover skins of the beams is shown to be an important factor in determining the ultimate strength of this type of construction. NACA TN 3232.

Buckling of a column under dynamic loading in the inelastic range, by S. V. Nardo and Burton Erickson. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. May 1952. 20p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114579

This report presents the results of a numerical calculation of the behavior of an initially slightly curved column when one of its simply supported ends is displaced rapidly in the axial direction. Contract no. N6onr-26308, Project no. NR 064-298. PIBAL 197.

Buckling of sandwich cylinders under bending and combined bending and axial compression, by Chi-Teh Wang and D. P. Sullivan. New York University, New York, N. Y. Jun 1951. 16p diagr, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114902

A theoretical investigation of the buckling of sandwich cylinders under bending and combined and compression is carried out. By solving a modified Donell's equation using Galerkin's method the buckling load is determined. For a sandwich cylinder with a weak core, it is found that buckling occurs when the maximum compressive stress in the cylinder reaches the buckling stress of the cylinder under axial compression alone. Contract N6onr-279, Task order V. Paper submitted by D. P. Sullivan as part of a thesis, June 1951.

Calculation and measurement of the natural frequencies and associated mode shapes of a box beam with a D-nose and with large discontinuities. U. S. National Bureau of Standards. NBS Lab no. 6.4/1-210. Reference NAonr 31-48, Project no. NR-035-200. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Progress report 2, by Frank C. Smith, Darnley M. Howard, Ira Smith. Jul 1950. 22p photos, drawing, graphs, tables Microfilm $2.25, Photocopy $4.00. PB 114529

This report describes the calculation of the four lowest natural frequencies and associated mode shapes of an aluminum alloy box beam with a D-nose and large discontinuities, oscillating with free-free end conditions. Technical report no. 5.

Progress report 3, by Frank C. Smith and Darnley M. Howard. Aug 1950. 17p drawing, graphs, tables Microfilm $2.00, Photocopy $2.75. PB 114530

This report presents the results of calculations made of the three lowest natural frequencies and associated mode shapes of an aluminum alloy box-beam having a large mass at its center and oscillating with free-free end conditions. Technical report no. 6.

Calculation of collapse and shake-down loads for elastic-plastic structures, by B. G. Neal and P. S. Symonds. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Sep 1949. 57p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114804

The possible economies that may be realized by the use of either type of plastic design theory are indicated. Certain limitations on the scope of the plastic design methods are emphasized in the concluding discussion. Contract N7onr-358, T. O. I, NR-041-032. GDAM TR 41. GDAM A11-41/55.

Damping, elasticity, and fatigue properties of materials and structures under sustained cyclic stress, by I. D. Eaton and B. J. Lazan. Syracuse University. Institute of Industrial Research. Materials Laboratories, Syracuse, N. Y. Aug 1947. 34p photos, diagrs (2 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114702

Contract no. N6ori-221, Technical report no. 1. Period covered: Dec 1, 1946-Aug 1, 1947. 1. Materials - Damping capacity 2. Materials - Elasticity 3. Materials - Fatigue 4. Structures - Strains and stresses 5. Damping capacity - Measuring equipment - Design 6. Vibration - Testing equipment 7. Syracuse vibration testing machine.

Dynamic analysis of the buckling of laterally loaded flat arches, by N. J. Hoff and Victor G. Bruce. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N. Y. Oct 1951. 24p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114903

An equation is derived for the locus of all points where the radio-compass indicator will start to reverse due to sense-antenna signal phase shift with respect to the loop-antenna signal as the station axis is approached and passed. The equation predicts that: (1) for a phase advance of the loop signal, relative to the sense-antenna signal, of slightly more than the 90-degree value applied by the basic ideal receiver, the apex of the conelike space figure locus rises off the ground; and (2) it would be possible to fly under this apex, producing but one reversal of the ADF indicator needle with this single reversal starting exactly over the radio station. Contract no. Nonr-267(00), Project no. 360-001. PIB AL 191.

Effect of axial loads on dynamic response of hinged beams, by T. H. H. Pian. Massachusetts Institute of Technology. Dept. of Aeronautical Engineering. Nov 1951. 31p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114538

The problem of the uniform beam supported on end hinges, which are restrained against axial movement, with the beam subjected to lateral loads of arbitrary time history, has been investigated analytically. The non-linear partial differential equation is reduced to a system of differential equations by a series solution, and is solved by numerical methods. The convergency of the solution is investigated; and the determination of the transient stresses is found to converge very rapidly by using an acceleration method of solution. Technical report no. 7 on Contract N5ori-07833, NR-035-259. Appendix A: Numerical solutions of non-linear differential equations.

Investigation of structural damping in simple built-up beams, by T. H. H. Pian and F. C. Hallowell, Jr. Massachusetts Institute of Technology. Dept. of Aeronautical Engineering. Feb 1950. 60p photos, drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114528

A theoretical study of the bending of a simple built-up beam with either spliced joints or thin reinforcing spar caps has been made. The analysis is based on the assumptions that the spar caps and the beam are held together by pressures which depend upon the tightness of the screw joints and that the clearances of the screws in the holes are large enough to allow sliding motion between the two surfaces. The theoretical results indicate that the non-linear component of the load-deflection curve contains mainly a second power term, and the energy loss per cycle varies approximately as the third power of the amplitude of vibration. Contract no. N5ori-07833, ONR project NR-035-259, Technical report no. 6.

Effect of shear stresses on the carrying capacity of I-beams, by Carl-Fredrik A. Leth. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Mar 1954. 71p drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photocopy $10.25. PB 114809

This paper considers the bending of a cantilever I-beam of a ductile metal, such as mild steel, that is loaded by a transverse force at the free end. Taking the length of the beam into account the load carrying capacity can be expressed in terms of the moment at the built-in end that is in equilibrium with the maximum transverse force at which collapse of the beam is imminent, owing to the development of regions of plastic flow. The influence of the length of the beam upon this limit moment is studied in the paper. Contract N7onr-35801, T. O. 1, NR-041-032. GDAM TR 107. GDAM A11-107.

Effect of the addition of a concentrated mass on the the dynamic behavior of a flexible structure, by Joseph B. Woodson. U. S. National Bureau of Standards. Jun 1950. 52p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114575

An analysis is given for calculating the new vibrational modes of a flexible structure (considered essentially plane) in terms of the known original modes, after the attachment of a single concentrated mass to the structure. A numerical example and experimental results are also presented. NBS Lab. no. 6.4/1-218. Contract no. NAonr 31-48, Project no. NR-035-200, Technical report no. 4.

Experimental stress analysis of stiffened cylinders with cutouts. Shear load, by Floyd R. Schlechte and Richard Rosecrans. U. S. National Advisory Committee for Aeronautics. Jul 1954. 87p photo, diagrs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114648

A cylindrical semimonocoque shell of circular cross section was mounted as a cantilever and loaded by a direct shear at the tip. The cylinder was tested with no cutout, with a rectangular cutout on the tension side, and with the cutout centered on the neutral axis on one side of the cylinder. Strain measurements were made with resistance-type wire strain gages near the cutout on the stringers, the skin, and the rings for each case, and the stresses obtained are presented in tables. NACA TN 3192.

Flexural waves in beams according to the more exact theory of bending, by Julius Miklowitz. U. S. Naval Ordnance Test Station, Inyokern, Calif. Sep 1953. 74p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photocopy $10.25. PB 114475

A complete wave solution for the problem of a semi-infinite beam subjected to a pure moment at the free end is worked out, and the resultant wave shapes are presented. NAVORD 2049. NOTS 741.

Further investigations on the problem of the buckling of a laterally loaded flat arch, by Victor Bruce. Polytechnic Institute of Brooklyn. Dept. of Agricultural Engineering and Applied Mechanics. Jun 1952. 16p diagrs, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114820

An energy integral of the two simultaneous differential equations which describe the motion of the first and second modes is obtained and calculations are made which clarify some assumptions. Some approximate calculations for an arch with fixed, rather than hinged, ends are also made. Contract no. 267-(00), Project no. NR 360-001. Continuation of PIB no. 191 (PB 114903). PIB AL 199.

Graphs for critical loadings of thin rectangular plates under compression in two perpendicular directions, by George A. Zizicas, Donald E. Johnston, James D. Revell, Jack V. Addison. California. University. Dept. of Engineering, Los Angeles, Calif. May 1952. 115p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.00, Photocopy $15.25. PB 114420

Graphs are presented for the direct evaluation of the critical combination of compression in two perpendicular directions which introduces buckling in simply supported thin elastic plates of rectangular shape. Both isotropic and orthotropic plates are covered. The latter are characterized by a single parameter suggested by H. W. March for which values from K = 0.1 to K = 5.00 are considered. A brief outline of the underlying theory and a few examples are also included. Contract no. AF 33(038)-14381. UC DE R 52-8.

Impact of finite beams of ductile metal, by P. S. Symonds and C.-F. A. Leth. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. 1953? 22p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114573

An analysis is presented of the large plastic deformations of a beam under impact such as that due to a blow of a massive hammer, in which one cross-section is suddenly forced to move with a given velocity. The analysis treats both the case in which the velocity of the struck section is maintained constant until the total permanent deformation is acquired and cases of interrupted impacts in which the force at the struck section is suddenly removed after an arbitrary contact time. A complete solution in general non-dimensional form is obtained in a simple manner by basing the analysis on the assumption of "plastic-rigid" behavior, and results can be expected to be valid when the plastic deformations are large enough. Criteria for the validity of the present results are discussed, based on the major assumptions of the analysis. Contract N7onr-35810, NR-360-003. GDAM TR 20. GDAM B11-20/22.

Influence coefficients of a two-cell monocoque box beam having a full bay cut-out, by William A. Garland, Wilhelmina D. Kroll, Preston R. Weaver. U. S. National Bureau of Standards. Feb 1951. 17p photo, drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114576

A comparison is presented between computed and experimental values of influence coefficients for a cantilevered two-cell five-bay monocoque box beam having a full bay cut-out in the cover sheet between the second and third bulkheads from the root. The method of computation used is based on Castigliano's theorem. NBS Lab. no. 6.4/209. Project no. 3514, Progress report 3. Contract NAonr 31-48, NR-035-200 (064-200), Technical report no. 7.

Influence of shearing forces on the plastic bending of wide beams, by E. T. Onat and R. T. Shield. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Dec 1953. 10p diagrs, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.50, Photocopy $1.50. PB 114933

Contract N7onr-35801, T. O. I, NR-041-032.
1. Beams, Structural - Plastic deformation - Theory 2. Beams, Structural - Bending moments 3. Shear stress - Theory 4. Mathematical equations and solutions 5. GDAM A11-103/10.

Investigation of the boundary condition at a perforated wall, by Paul F. Maeder. Brown University. Division of Engineering, Providence, R. I. May 1953. 37p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114596

The boundary condition to be applied to the flow along a perforated wall is investigated theoretically using potential flow theory. The theory is confirmed by subsequent experiments with a low speed tunnel. The boundary condition thus found is linear and not quadratic as was previously supposed. Contract N-7onr-35805. Technical report WT-9.

Large plastic deformations of beams under blast loading, by P. S. Symonds. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Dec 1953. 44p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114806

Plastic deformations of supported beams under dynamic loading are determined under the assumption of negligible elastic strains. Particularly simple solutions are in several cases obtained when the

load-time curve is of a class defined in the paper, which includes typical blast pressure curves and rectangular pulses as simple examples. Contract N7onr-35801, T. O. 1, NR-064-406. GDAM A11-99.

Limits of economy of materials in plates, by H. G. Hopkins and W. Prager. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Apr 1954. 13p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114741

The paper is concerned with the limits of economy of material in a simply-supported circular plate under a uniformly-distributed transverse load. Stepped plates of segmentwise constant thickness are discussed. Contract DA-19-020-ORD-798. Ordnance project TB 3-0122. Dept. of the Army project 503-06-005. GDAM TR 11. GDAM DA-798/11.

More fundamental approach to plastic stress-strain relations, by D. C. Drucker. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. May 1951. 15p drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114805

Essentially thermodynamic definitions of work-hardening and of ideally plastic materials are re-employed to remove an unncessary assumption in the derivation of the general Mises-Prager plastic potential stress-strain relations. In particular it is shown that the loading surface or any of the customary yield curves for work-hardening or ideally plastic materials must be convex. The meaning of corners in such curves or vertices in the loading surfaces is discussed with especial reference to problems of uniqueness. Contract N7onr-358, T. O. 1, NR-041-032. GDAM TR 58. GDAM A11-58/13.

Mouvements ondulatoires de la mer en profondeur constante ou décroissante. Forme limite de la houle lors de son déferlement: Application aux digues maritimes. (Undulatory movements of the sea in constant or decreasing depth. Limited form of the wave at the time of breaking: Application to marine structures), by M. Miche. Translated by M. Lincoln and R. R. Chevron, and edited by R. A. Fuchs. Jun 1954. 100p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photocopy $12.75. PB 114746

Part II not translated.
1. Waves, Ocean - Movement - France 2. Waves, Ocean - Mathematical analysis - France 3. Waves, Ocean - Pressure - France 4. Hydrodynamics - Theory - France 5. Structures, Underwater - Wave force - Theory - France 6. UC IER Ser. 3, Issue 363.

Nonlinear oscillations of visco-elastic plates, by A. Cemal Eringen. Illinois Institute of Technology. Dept. of Mechanics. Dec 1952. 52p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. PB 114507

By means of a systematic approximation based on the perturbation theory, from the three-dimensional, non-linear elasticity theory, five partial differential equations are obtained for the non-linear oscillations of visco-elastic plates. Boundary and initial conditions are discussed and an expression for the strain energy is given. Contract N7onr-32909. Technical report no. 3.

Nonlinear theory of bending and buckling of thin elastic shallow spherical shells, by A. Kaplan and Y. C. Fung. U. S. National Advisory Committee for Aeronautics. Aug 1954. 58p photo, drawing, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114965

Experimental results seem to indicate that the classical criterion of buckling is applicable to very shallow spherical domes for which the theoretical calculation was made. A transition to energy criterion for higher domes is also indicated. NACA TN 3212.

Note on deblocked transonic testsections, by P. R. Maeder. Brown University. Division of Engineering, Providence, R. I. May 1950. 44p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114700

Contract N7onr-35805, Project NR-061-078. Technical memorandum WT-4.
1. Flow, Transonic 2. Wind tunnels, Transonic - Blocking.

On certain second order effects in the limit design of frames, by E. T. Onat. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Dec 1953. 11p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114931

Contract N7onr-35801, T. O. I, NR-041-032.
1. Beams, Structural - Plastic deformation - Theory 2. Beams, Structural - Loads - Theory 3. Stability, Structural - Limit analysis 4. Mathematical equations and solutions 5. GDAM A11-100/11 8. GDAM TR 100.

Plastic deformation in beams under symmetric dynamic loads, by J. A. Seiler and P. S. Symonds. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Jun 1953. 28p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114571

Plastic deformations in beams caused by dynamic loads distributed over finite lengths are considered

in this paper. The analysis is based on the assumption of "plastic-rigid" behavior so that the results should be valid when plastic deformations are sufficiently large. The final deformations for distributed loads are found not to differ much qualitatively from those to be expected for concentrated loads. Contract N7onr-35810, NR-360-003. GDAM TR 13. GDAM B11-13/27.

Surface waves and offshore structures: The design wave in deep or shallow water, storm tide, and forces on vertical piles and large submerged objects, by Robert O. Reid and Charles L. Bretschneider. Texas. Agricultural and Mechanical College. Dept. of Oceanography. Oct 1953. 63p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114421

Methods are presented which allow an estimate of the basic dimensions of design waves for offshore structures, the design still water depth, and the forces exerted by the design waves on pile structures and large submerged objects such as barges. A brief summary of deep water hindcast relationships is presented. A method is also presented which allows the determination of the design waves generated in shallow water, taking dissipation of energy at the bottom into account. In addition, formulas are presented to allow an estimate of storm tide rise on a continental shelf. Also a graph for the evaluation of the height of the wave crest above still water level is given. Formulas and graphs for facilitating the estimation of the total wave force and position of action of the force on piles are given. Contracts NOy-27474, DA-49-055-eng-18, and N7onr-48704.

Torsional instability of a long sandwich cylinder, by George Gerard. New York University. College of Engineering. Daniel Guggenheim School of Aeronautics. Nov 1950. 24p graph, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114912

Contract no. N6-onr-279, Task order V.
1. Cylinders, Sandwich - Torsion - Theory.

Torsional vibrations of hollow thin-walled cylindrical beams, by Edwin T. Kruszewski and Eldon E. Kordes. U. S. National Advisory Committee for Aeronautics. Aug 1954. 33p diagrs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114996

Solutions for beams of arbitrary doubly symmetrical cross section with uniform wall thickness are given for cantilever and free-free beam vibrations. Numerical results are shown for cylinders of rectangular cross section and the influence of bending stresses due to torsion and longitudinal inertia is discussed. The solutions for beams of rectangular cross section are used to investigate the accuracy of a solution based on an analysis of a four-flange box beam. NACA TN 3206.

TEXTILES AND TEXTILE PRODUCTS

Estimation of copper-8-quinolinolate in mildew-proofed fabrics: Methods applicable in the presence of other copper-containing fungicides. Final report: Development of analytical methods for fungicides, by Arthur Rose, A. Witt Hutchinson, and John R. Hayes. Applied Science Laboratories, Inc., State College, Pa. Dec 1953. 10p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 111457

Contract no. DA-44-109-qm-1239. Report Q-53-5.
1. Copper-8-quinolinolate 2. Fungicides - Analysis 3. Fabrics, Impregnated - Copper determination.

Factors affecting the translation of certain mechanical properties of cordage fibers and yarns into cordage strands and ropes, by M. M. Platt, W. G. Klein, and W. J. Hamburger. Fabric Research Laboratories, Inc., Boston, Mass. Dec 1953. 86p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.00, Photocopy $11.50. PB 114743

This report is concerned with the quantitative analysis of some of the factors which determine the strength of cordage strands and plied yarns. The factors which are mathematically analyzed for their mechanical effects include: singles yarn twist; strand or plied yarn twist; number of singles which are stranded; elastic properties of the singles yarns; and uniformity of the mechanical properties of the singles yarns. Case number C47736. Contract N-7onr 421-I, Project NR 330-004. Technical report no. 7.

Manufacture of superfine organic fibers, by V. A. Wente, E. L. Boone, and C. D. Fluharty. U. S. Naval Research Laboratory. May 1954. 18p photos, drawing, diagr, graphs, table Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111437

An adjustable extruder forces a hot thermoplastic melt through a row of fine orifices into high-velocity dual streams of heated gas, usually air. The nozzle design provides for immediate resumption of attenuation following breaks. Nylon, linear polyester, polytrifluorochloroethylene, silicone, polystyrene, and other fibers can be produced. Materials such as polyvinyl chloride and polyacrylonitrile cannot be employed in this process. Proper balancing of all the variables yields fine fibers of good uniformity and quality. NRL R 4364.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Aileron reversal and wing divergence of swept wings, by E. G. Broadbent and Ola Mansfield. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Sep 1947. 26p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.70. PB 114948

Cover date is 1954. S. O. code no. 23-2817.
1. Wings, Swept - Divergence - Gt. Brit. 2. Ailerons - Reversal - Gt. Brit. 3. ARC RM 2817.

Analysis of shock-wave cancellation and reflection for porous walls which obey an exponential mass-flow pressure-difference relation, by Joseph M. Spiegel and Phillips J. Tunnell. U. S. National Advisory Committee for Aeronautics. Aug 1954. 23p diagr, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114980

1. Shock waves - Reflection 2. Wind tunnels - Walls - Effects 3. Flow, Two-dimensional - Theory 4. Suction - Effects 5. NACA TN 3223.

Analytical investigation of airplane spin-recovery motion by use of rotary-balance aerodynamic data, by Stanley H. Scher. U. S. National Advisory Committee for Aeronautics. Jun 1954. 38p drawings, diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114443

1. Airplanes - Spinning - Recovery 2. Airplanes - Stability - Testing methods 3. Stability, Directional - Analysis 4. Airplanes - Balance - Controls 5. NACA TN 3188.

Bericht über die sitzung flattern und rollverhalten von fahrwerken am 16./17. oktober 1941 in Stuttgart (Papers on shimmy and rolling behavior of landing gears, presented at Stuttgart conference, Oct. 16 and 17, 1941). Lilienthal Gesellschaft für Luftfahrtforschung, Berlin. Translated by Mary L. Mahler. Aug 1954. 230p photos, diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114962

Lilienthal Gesellschaft für Luftfahrtforschung. Bericht 140. Contents: Experiences in flight operation, by E. Hoffmann. - Lateral guiding forces on obliquely running airplane tires, by R. Harling. - Stiffness of various tires, by H. Schrode. - Force distribution in the contact surface between tire and runway, by P. Kraft. - Veering-off in take-off and landing, by F. N. Scheubel. - Veering-off (ground looping) of aircraft equipped with tail-wheel landing gears, by E. Maier. - Rolling stability of airplane landing gears and resultant requirements for swiveling wheels, by L. Huber. - On the mechanics of the rolling of an airplane with a nose-wheel landing gear, by T. E. Schunck. - Fundamental perceptions on wheel shimmy, by P. Riekert. - Shimmying of a pneumatic wheel: A. Tire mechanics, by B. v. Schlippe. - B. Wheel shimmy, by R. Dietrich. - Comments on two American research reports (Stability of castering wheels for aircraft landing gears, by Arthur Kantrowitz. NACA Report 686, 1940, and Dynamic problems of the tricycle landing gear, by Wylie. Journal of the Aeronautical Sciences, vol. 7, no. 2, Dec 1939). - Investigation of tail-wheel shimmy on the model Me 110, by M. Renz. - Appendix: Brief report on the theory of wheel shimmy, by H. Fromm. - Sideslip and guiding characteristics of the rolling wheel, by H. Fromm. - Supplement for clarification of several remarks in the discussion, by B. v. Schlippe and R. Dietrich. - Oscillation damping on the rolling wheel, by H. Fromm. NACA TM 1365.

Calibration of the R.A.E. no. 18 (9 in x 9 in) supersonic wind tunnel. Part II: Test at atmospheric stagnation pressure, by W. T. Lord, G. K. Hunt, R. J. Pallant and J. Turner. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Sep 1953. 14p drawings, diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. PB 114953

Cover date is 1954. S. O. code no. 23-9007-63.
1. Wind tunnels, Supersonic - Calibration - Gt. Brit. 2. Wind tunnels, Supersonic - Tests - Gt. Brit. 3. Wind tunnels, Supersonic - Humidity - Gt. Brit. 4. Wind tunnels, Supersonic - Pressure - Gt. Brit. 5. Mach number - Effect - Gt. Brit. 6. Atmosphere - Pressure - Gt. Brit. 7. Gt. Brit. Royal Aircraft Establishment, Farnborough, England 8. ARC CP 163. 9. RAE TN Aero 2236.

Changes in control characteristics with changes in flow pattern at high subsonic speeds. Tests on an EC.1250 aerofoil with 25 percent concave control flap. Parts I and II, by R. A. Shaw. Gt. Brit. Ministry of Supply. Aeronautical Research Council Apr 1949. 32p photos, diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.90. PB 114881

Cover date is 1954. S. O. code no. 23-2436.
1. Airfoils - Controls - Gt. Brit. 2. Airfoils - Pressure distribution - Gt. Brit. 3. Airfoils - Wind tunnel tests - Gt. Brit. 4. Flow, Subsonic - Theory - Gt. Brit. 5. Prandtl-Meyer theory (Aerodynamics) - Gt. Brit. 6. Mach number - Effect - Gt. Brit. 7. Reynolds number - Effect - Gt. Brit. 8. Flaps, Aircraft - Controls - Theory - Gt. Brit. 9. ARC RM 2436.

Considerations on a large hydraulic jet catapult, by Upshur T. Joyner and Walter B. Horne. U. S. National Advisory Committee for Aeronautics. Jul

1954. 49p photos, drawings, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114753

1. Catapults, Hydraulic - Jet flow - Design 2. Catapults, Hydraulic - Jet flow - Performance 3. Loads, Landing - Photographic interpretation 4. Impact - Theory 5. NACA TN 3203.

Criteria for condensation free flow in the R.A.E. no. 18 (9in. x 9in.) supersonic tunnel, by D. J. Raney and D. Beastall. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jun 1953. 18p drawing, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 114698

Cover date is 1954. S. O. code no. 23-9007-64.
1. Wind tunnels, Supersonic - Effect of condensation - Gt. Brit. 2. Wind tunnels, Supersonic - Moisture control - Gt. Brit. 3. ARC CP 164 4. RAE TN Aero 2249.

Current distribution on wing-cap and tail-cap antennas, by Irene C. Carswell. Stanford Research Institute, Stanford, Calif. May 1954. 23p photo, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114994

Current paths responsible for resonance effects are investigated as the frequency is varied, and their effect on antenna impedance is discussed. Measured results are also applied to the interpretation of radiation patterns. A technique is described for measuring the relative amplitude and phase of the surface current, and for determining the direction of current flow. Contract no. AF 19(604)-266. SRI Proj 591, Technical report 43.

Experiment at M = 1.8 on bodies of revolution having ogival heads, by H. K. Zienkiewicz, A. Chinneck, C. J. Berry and P. J. Peggs. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jan 1953. 11p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.25. PB 114694

Cover date is 1954. S. O. code no. 23-9007-48.
1. Bodies of revolution - Pressure distribution - Measurements - Gt. Brit. 2. Wind tunnels, High speed - Tests - Gt. Brit. 3. Mach number - Effect - Gt. Brit. 4. ARC CP 148.

Experimental results on the acceleration damper, by Paul Lieber and Fay Tripp. Rensselaer Polytechnic Institute. Dept. of Aeronautical Engineering, Troy, N. Y. Feb 1954. 15p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114523

An experimental investigation was undertaken to determine the design of an acceleration damper to be used in arresting the motion of a non-uniform cantilever beam. Contract no. Nonr 591(00) 591(01). TR AE 5401.

Experimental study of the lift and pressure distribution on a double-wedge profile at Mach numbers near shock attachment, by Walter G. Vincenti, Duane W. Dugan and E. Ray Phelps. U. S. National Advisory Committee for Aeronautics. Jul 1954. 43p drawing, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114793

1. Wing theory 2. Wing profiles - Angle of attack 3. Wing profiles - Lift 4. Wing profiles - Drag - Calculations 5. Wing profiles - Pressure distribution 6. Flow, Mixed - Theory 7. Mach number - Effect 8. NACA TN 3225.

Fallhammerversuche mit drei ölfederstrebenmustern und drei verschiedenen federstrebenölen bei tiefen temperaturen (Drop hammer tests with three oleo strut models and three different shock strut oils at low temperatures), by Herr Kranz. Translated by Mary L. Mahler. Jul 1954. 55p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 39001t

Drop hammer tests with different shock strut models and shock strut oils were performed at temperatures ranging to -40 C. The various shock strut models do not differ essentially regarding their springing and damping properties at low temperatures; however, the influence of the different shock strut oils on the springing properties at low temperatures varies greatly. NACA TM 1372. ZWB UM 564 Translation.

Flutter of swept and unswept wings with fixed-root conditions, parts I, II and III, by W. G. Molyneux. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jan 1950. 23p photo, drawing, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.50. PB 114408

Cover date is 1954. S. O. code no. 23-2796.
1. Wings - Root sections - Pressure distribution - Tests - Gt. Brit. 2. Wings, Swept - Flutter - Gt. Brit. 3. Wings, Swept - Stiffness - Gt. Brit. 4. Wings, Swept - Torsion - Gt. Brit. 5. Wings, Unswept - Flutter - Gt. Brit. 7. Wings, Unswept - Torsion - Gt. Brit. 8. Wings, Swept - Wind tunnel tests - Gt. Brit. 9. Wings, Unswept - Wind tunnel tests - Gt. Brit. 10. ARC RM 2796.

Further experiments on an NACA 23021 aerofoil with a 15 percent Handley Page slotted flap in the compressed air tunnel, by R. Jones and A. H. Bell. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Aug 1946. 16p diagrs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.15. PB 114883

Cover date is 1954. S. O. code no. 23-2519.
1. Airfoils - Wind tunnel tests - Gt. Brit. 2. Flaps, Slotted - Lift - Gt. Brit. 3. Flaps, Slotted - Drag -

Gt. Brit. 4. Flaps, Slotted - Pitching moment coefficients - Gt. Brit. 5. Reynolds number - Effect 6. ARC RM 2519.

Impingement of water droplets on NACA 65A004 airfoil at 8° angle of attack, by Rinaldo J. Brun, Helen M. Gallagher and Dorothea E. Vogt. U. S. National Advisory Committee for Aeronautics. Jul 1954. 27p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114829

1. Airfoils - Ice formation 2. Drops, Liquid - Impingement on airfoils 3. Trajectories, Water droplet 4. Ice formation - Meteorological analysis 5. NACA TN 3155.

Investigation of means to maintain zero electrical charge on aircraft. Final engineering report under Contract no. AF 19(122)-475, by Frank M. Pelton. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Oct 1953. 66p photo, diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.25, Photocopy $9.00. PB 114764

For Interim reports see PB 108572, PB 112158, PB 113587.
1. Zero Electrical Charge System 2. Aircraft - Electrostatics 3. Electricity, Static - Elimination 4. CAL RA-766-P-10.

Lift and pitching moment at supersonic speeds due to constant vertical acceleration for thin sweptback tapered wings with streamwise tips, supersonic leading and trailing edges, by Isabella J. Cole and Kenneth Margolis. U. S. National Advisory Committee for Aeronautics. Jul 1954. 67p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114792

1. Wing theory 2. Wings, Sweptback - Lift distribution 3. Wings, Sweptback - Pitching moments 4. Damping derivatives - Coefficients 5. Damping derivatives - Stability 6. Mach number - Effect 7. Flow, Supersonic - Theory 8. NACA TN 3196.

Notes on the induced drag of a wing-tail combination, by C. H. Naylor. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jul 1946. 10p graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 114884

Cover date is 1954. S. O. code no. 23-2528.
1. Drag, Profile - Measurements - Gt. Brit. 2. Wings - Drag - Theory - Gt. Brit. 3. Wings - Interference - Gt. Brit. 4. Tail surfaces - Drag - Gt. Brit. 5. Tail surfaces - Interference - Gt. Brit. 6. ARC RM 2528.

Procedure for the design of air-heated ice-prevention systems, by Carr B. Neel, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1954. 63p photo, drawings, diagrs, map, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114395

1. Ice prevention systems - Design 2. Airplanes - Icing prevention 3. NACA TN 3130.

Published reports and memoranda of the Aeronautical Research Council. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jan 1954. 6p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 114882

S. O. code no. 23-2450.
1. Aeronautical research - Bibliography - Gt. Brit. 2. ARC RM 2450.

Reduction of helicopter parasite drag, by Robert D. Harrington. U. S. National Advisory Committee for Aeronautics. Aug 1954. 8p drawings, graph, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114964

1. Helicopters - Drag 2. Helicopters - Design 3. NACA TN 3234.

Statistical measurements of contact conditions of 478 transport-airplane landings during routine daytime operations, by Norman S. Silsby. U. S. National Advisory Committee for Aeronautics. Jun 1954. 32p photos, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114397

1. Airplanes, Transport - Landing 2. Landing approach - Photographic interpretation 3. Airplanes, Transport - Speed 4. Loads, Landing - Impact - Photographic interpretation 5. NACA TN 3194.

Study on the subsonic forces and moments on an inclined plate of infinite span, by Bradford H. Wick. U. S. National Advisory Committee for Aeronautics. Jun 1954. 25p diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114554

1. Plates, Flat - Hydrodynamics 2. Flow, Subsonic - Theory 3. Mach number - Effect 4. Rayleigh-Kirchhoff theory 5. Airfoil theory 6. Airfoils - Lift 7. Airfoils - Pitching moments 8. NACA TN 3221.

Suitability of the gray instrument panel for use in USAF aircraft, by Robert J. Lacey. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1954. 17p tables Available from Library of Congress, Publication Board

Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114944

1. Airplanes - Instrument panels 2. AAF WADC TN WCRD 54-12.

Tests of bonded and riveted sheet-stringer panels, by Leonard Mordfin and I. E. Wilks. U. S. National Advisory Committee for Aeronautics. Jun 1954. 45p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114336

1. Panels, Stiffened - Compression tests 2. Panels, Aluminum alloy - Compression tests 3. Panels, Bonded - Tests 4. Panels, Riveted - Tests 5. Stiffeners, Longitudinal - Stress distribution 6. U. S. National Bureau of Standards 7. NACA TN 3215.

Theoretical investigation of the effects upon lift of a gap between wing and body of a slender wing-body combination, by Duane W. Dugan and Katsumi Hikido. U. S. National Advisory Committee for Aeronautics. Aug 1954. 41p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114966

1. Airplanes - Lift - Theory 2. Airplanes - Lift - Effect of wing-body gap 3. NACA TN 3224.

Theory of the acceleration damper leading to a rational design procedure, by Carl Grubin and Paul Lieber. Rensselaer Polytechnic Institute. Dept. of Aeronautical Engineering, Troy, N. Y. Mar 1952. 47p drawing, graphs (2 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114517

An exact steady-state theory is presented which leads to a rational procedure for designing the acceleration damper to reduce the vibration amplitude of a single degree of freedom system to a prescribed value, when the system is subjected to a simple harmonic force. Some preliminary discussion, relating to the extension of the theory presented here, for calculating the effect of a multiple container damper attached to a primary vibrating system subjected to a non-simple harmonic force, is also presented. Contracts no. Nonr-591(00) and Nonr-591(01). RPI no. 1.

Wind-tunnel tests on two-dimensional supersonic aerofoils at M-1.86 and M-2.48, by D. Beastall and R. J. Pallant. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jul 1950. 20p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 114409

Cover date is 1950. S. O. code no. 23-2800.
1. Mach number - Effect - Gt. Brit. 2. Airfoils, Two-dimensional - Pressure distribution - Gt. Brit. 3. Airfoils - Wind tunnel tests - Gt. Brit. 4. Flow, Supersonic - Pressure distribution - Gt. Brit. 5. Shock waves - Photography - Gt. Brit. 6. ARC RM 2800.

Wing parachutes for recovery from the spin. Part I: General design requirements, by G. E. Pringle and T. V. Somerville. Part II: Wake phenomena, by D. J. Harper, J. R. Mitchell, J. Picken and G. E. Pringle. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Mar 1947. 10p drawing, diagrs, graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 114947

Cover date is 1954. S. O. code no. 23-2543.
1. Wing tips - Parachutes - Design - Gt. Brit.
2. Wing tips - Parachutes - Design - Gt. Brit.
3. Wing tips - Parachutes - Wake - Gt. Brit.
4. Airplanes - Spinning - Recovery - Gt. Brit.
5. ARC RM 2543.

Instruments

Analytical and simulation studies of several radar-vectoring procedures in the Washington, D. C., terminal area, by Samuel M. Berkowitz and Ruth R. Doering. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1954. 70p diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $2.00. PB 111367

Theory, circuits, characteristics, and applications of fixed capacitors are reviewed. The treatment of the subject is progressive and as complete as is practicable in view of the information which is currently available. Problems which are related to capacitor use, design, etc., as well as the solutions to the problems, are included. Basic formulas are provided as an aid in understanding. Prepared for Air Navigation Development Board under Project no. 6.7. Includes report of work by Franklin Institute under Contract no. C 13 ca-412. CAA TDR 222.

Design and use of counting accelerometers, by J. Taylor. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jun 1950. 11p photos, drawing, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 114667

The fundamental principles underlying acceleration recording by means of a counting accelerometer are analysed. The essential design requirements for a counting accelerometer are presented. Both mechanical and electrical counting are considered. Cover date is 1954. S. O. code no. 23-2812. Also published as RAE TN Struc 78. ARC RM 2812. RAE TN Struc 78.

Lag in airborne pressure measuring systems, by B. G. Newman. Canada. National Aeronautical Establishment. Apr 1954. 53p diagr, graphs Available from Library of Congress, Publication

Board Project, Washington 25, D. C. Microfilm $3.00, Photocopy $7.75. Available for exchange from National Aeronautical Establishment, Ottawa Road, Montreal, Canada. PB 114861

A semi-empirical formula for viscous lag is obtained. It applies generally to systems comprising tubes of various diameters connected to several measuring instruments. The effect of bends, and an annular pipe in the system, is considered. A value for the acoustic lag is added and the resulting formula applied to airborne systems comprising altimeters, airspeed indicators and machmeters. NAEC LR 100.

Engines and Propellers

Determination of flame temperatures from 2000° to 3000° K by microwave absorption, by Perry W. Kuhns. U. S. National Advisory Committee for Aeronautics. Aug 1954. 48p photo, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114968

1. Flame - Temperature - Measurement 2. Waves, Electromagnetic - Attenuation 3. NACA TN 3254.

Downwash measurements behind a 12-ft. diameter helicopter rotor in the 24-ft. wind tunnel, by R. A. Fail and R. C. W. Eyre. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Sep 1949. 12p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 114666

Cover date is 1954. S. O. code no. 23-2810. Also published as RAE TN Aero 2018.
1. Helicopters - Rotors - Downwash - Gt. Brit. 2. Helicopters - Rotors - Wind tunnel tests - Gt. Brit. 3. ARC RM 2810 4. RAE TN Aero 2018.

Fundamental study of erosion caused by steep pressure waves, by B. G. Rightmire and J. M. Bonneville. U. S. National Advisory Committee for Aeronautics. Jun 1954. 30p photos, drawing, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114542

1. Bearings, Sleeve - Erosion 2. Bearings, Sleeve - Lubrication 3. Lubricating oils - Corrosiveness 4. Copper - Erosion 5. NACA TN 3214.

Low pressure flexible hose and end-fittings for aircraft fuel systems (Fire-resistant and non-fire-resistant). Specification of particular requirements to accompany the contract agreement. Gt. Brit. Ministry of Supply. Jan 1954. 15p drawings, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 114954

Issue no. 2.
1. Engines, Aircraft - Fuel systems - Gt. Brit. 2. Hose, Fuel - Low pressure - Gt. Brit. 3. MS DTD MS (R.D.L) 3951.

Method for evaluating the effects of drag and inlet pressure recovery on propulsion-system performance, by Emil J. Kremzier. U. S. National Advisory Committee for Aeronautics. Aug 1954. 22p diagr, graphs (1 fold) Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114983

1. Drag, Aerodynamic - Theory 2. Ducts, Air - Inlet pressure 3. Propellers - Thrust - Theory 4. NACA TN 3261.

Oscillating pressures near a static pusher propeller at tip Mach numbers up to 1.20 with special reference to the effects of the presence of the wing, by Harvey H. Hubbard and Leslie W. Lassiter. U. S. National Advisory Committee for Aeronautics. Jul 1954. 35p photos, diagr, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114585

1. Propeller theory 2. Propellers - Pressure - Measurement 3. Interference, Propeller - Theory 4. Mach number - Effect 5. Wings - Interference 6. Nacelles, Engine - Load distribution 7. NACA TN 3202.

Review of information on induced flow of a lifting rotor, by Alfred Gessow. U. S. National Advisory Committee for Aeronautics. Aug 1954. 16p photo, diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114999

1. Helicopters - Rotors - Flow, Induced 2. NACA TN 3238.

24-ft. wind tunnel tests on a propeller with NACA 16 series sections. Test results and analysis into mean lift-drag data, by A. R. C. MacDougall and A. B. Haines. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Aug 1948. 18p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 114662

Cover date is 1954. S. O. code no. 2602.
1. Propellers - Design - Gt. Brit. 2. Propellers - Wind tunnel tests - Gt. Brit. 3. Propellers - Lift - Gt. Brit. 4. Propellers - Drag - Gt. Brit. 5. ARC RM 2602.

Wind-tunnel studies of the performance of multirotor configurations, by Richard C. Dingeldein. U. S. National Advisory Committee for Aeronautics. Aug 1954. 10p photo, diagr, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114998

1. Helicopters - Rotors - Thrust, Static 2. Helicopters - Rotors - Wind tunnel tests 3. Helicopters - Rotors, Tandem 4. NACA TN 3236.

Training and Training Devices

Senior personnel specialist: A job description, by Dorothy E. Lenard and Willard E. North. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Technical Training Research Laboratory, Chanute Air Force Base, Ill. Jun 1953. 15p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114986

Project no. 507-015-0002.
1. Job analysis 2. Personnel, Flying - Classification 3. AAF HRRC TP 53-12.

Aerodynamics

Axially symmetric three-dimensional fluid flow. Third technical report under Contract no. N7-onr-32905: The ring doublet in ideal fluid flow, by V. L. Streeter. Illinois Institute of Technology, Chicago, Ill. Jun 1950. 17p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114908

Research project no. 4955, Report no. 9. Reprinted from Proceedings of the Midwestern Conference on Fluid Dynamics, University of Illinois, May 1950. For final report on this contract see PB 114909.
1. Flow, Fluid - Velocity - Theory 2. Flow, Incompressible - Theory 3. Flow, Axially symmetric - Theory.

Characteristics of turbulence in a boundary layer with zero pressure gradient, by P. S. Klebanoff. U. S. National Advisory Committee for Aeronautics. Jul 1954. 56p drawing, diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114830

1. Boundary layer, Turbulent - Flow 2. Flow, Turbulent - Theory 3. Gaussian law (Mathematics) 4. NBS 2454 5. NACA TN 3178.

Dynamic buckling of slender struts, by T. H. H. Pian and J. N. Siddall. Massachusetts Institute of Technology. Dept. of Aeronautical Engineering. May 1950. 74p photos, drawings, diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photocopy $10.25. PB 113636

The problems of the initially bent strut and the eccentrically loaded strut subjected to end loads of arbitrary time history have been studied theoretically. Various mathematical methods of solution such as differential equation, integral equation, and energy methods have been considered. A step-by-step differential equation solution has been developed for the uniform eccentrically loaded strut. Tests have been made in which impact loads of different magnitude and duration are applied to the ends of a slender uniform bar with various eccentricities. Contract N5-ori-07833, NR-035-259.

Examination of the existing data on the heat transfer of turbulent boundary layers at supersonic speeds from the point of view of Reynolds analogy, by Alvin Seiff. U. S. National Advisory Committee for Aeronautics. Aug 1954. 38p diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 115000

1. Flow, Supersonic - Theory 2. Boundary layer, Turbulent - Heat transference 3. Reynolds number - Effect 4. Airplanes - Skin - Friction 5. NACA TN 3284.

Experimental investigation of temperature recovery factors on a 10° cone at angle of attack at a Mach number of 3.12, by John R. Jack and Harry Moskowitz. U. S. National Advisory Committee for Aeronautics. Jul 1954. 15p drawings, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114794

1. Cones - Surface temperature 2. Angle of attack - Effect on surface temperature 3. Mach number - Effect 4. Reynolds number - Effect 5. Wind tunnels, Supersonic - Pressure 6. Heat - Transference - Aerodynamics 7. NACA TN 3256.

Exploratory investigation of skin friction and transition of three bodies of revolution at a Mach number of 1.61, by John H. Hilton, Jr. and K. R. Czarnecki. U. S. National Advisory Committee for Aeronautics. Jun 1954. 15p drawings, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114396

1. Bodies of revolution - Fineness ratio 2. Bodies of revolution - Pressure distribution 3. Airplanes - Skin - Friction - Theory 4. Mach number - Effect 5. Angle of attack - Effect of pressure 6. Reynolds number - Effect 7. Flow, Supersonic - Theory 8. Flow, Laminar - Theory 9. Flow, Turbulent - Theory 10. NACA TN 3193.

Flow over a flat plate with an angle of attack at Mach number one, by Gottfried Guderley. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1953. 45p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photocopy $6.50. PB 114925

The pressure distribution over a flat plate at Mach number one is determined, using the usual transonic approximations. The solution for the pressure distribution on the pressure side is given by a relatively simple closed expression. The pressure distribution on the suction side is found by the method of characteristics but can be approximated by a similarly simple analytical expression. In the appendix the method

used here is applied to a similar problem occurring in a paper by B. Marschner. AAF WADC TR 53-404.

Heat, mass, and momentum transfer for flow over a flat plate with blowing or suction, by H. S. Mickley, R. C. Ross, A. L. Squyers and W. E. Stewart. U. S. National Advisory Committee for Aeronautics. Jul 1954. 151p photos, drawing, diagr, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114755

1. Boundary layer - Suction effect 2. Boundary layer, Laminar - Theory 3. Heat - Transference - Theory 4. Mass transference - Theory 5. Momentum transference - Theory 6. Flow, Incompressible - Theory 7. Flow, Laminar - Theory 8. Flow, Turbulent - Theory 9. Reynolds number - Effect 10. NACA TN 3208.

Influence of surface waves on the stability of a laminar boundary layer with uniform suction, by D. A. Spence and D. G. Randall. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Mar 1953. 29p diagr, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 114952

Cover date is 1954. S. O. code no. 23-9007-61.
1. Airfoils - Boundary layer - Suction effect - Gt. Brit. 2. Boundary layer, Laminar - Pressure gradients - Gt. Brit. 3. Reynolds number - Effect - Gt. Brit. 4. Wing profiles - Pressure distribution - Gt. Brit. 5. Lin theory (Aerodynamics) - Gt. Brit. 6. Gt. Brit. Royal Aircraft Establishment, Farnborough, England 7. ARC CP 161 8. RAE TN Aero 2241.

Integration of the Reynolds equations for incompressible turbulent boundary layers, by Donald Ross. Pennsylvania State College. School of Engineering. Ordnance Research Laboratory, State College, Pa. May 1953. 14p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114901

Report no. 2 under ONR project NR 062-139. Serial no. NOrd 7958-268.
1. Reynolds number 2. Karman's momentum theory 3. Boundary layer, Turbulent - Theory 4. Plates, Flat - Boundary layer.

Investigation of distributed surface roughness on a body of revolution at a Mach number of 1.61, by K. R. Czarnecki, Ross B. Robinson and John H. Hilton, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1954. 35p photo, drawing, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114545

1. Flow, Laminar - Theory 2. Flow, Turbulent - Theory 3. Airplanes - Skin - Friction - Wind tunnel tests 4. Bodies of revolution - Surface roughness 5. Wind tunnels, Supersonic - Pressure 6. Heating, Aerodynamic - Theory 7. Mach number - Effect 8. NACA TN 3230.

Investigation of the effects of boundary layer control on the lateral dynamic stability of an airplane with and without sweepback, by N. P. Hobbs and L. Segel. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Mar 1950. 33p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photocopy $5.25. PB 114904

W. A. 118-911.
1. Airplanes - Stability - Effect of boundary layer 2. Stability, Lateral - Dynamic 3. Boundary layer - Control - Effect on stability 4. CAL AG-567-F-1.

Measurement of heat transfer in the turbulent boundary layer on a flat plate in supersonic flow and comparison with skin-friction results, by C. C. Pappas. U. S. National Advisory Committee for Aeronautics. Jun 1954. 32p drawing, diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114555

1. Flow, Supersonic - Theory 2. Flow, Turbulent - Theory 3. Boundary layer, Turbulent - Heat transference 4. Heat - Transference - Aerodynamics 5. Heat - Transference - Measurements 6. Airplanes - Skin - Friction - Wind tunnel tests 7. NACA TN 3222.

New hodograph for free-streamline theory, by Anatol Roshko. U. S. National Advisory Committee for Aeronautics. Jul 1954. 39p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114600

1. Hodographs 2. Wedges - Pressure distribution - Theory 3. Cylinders, Circular - Pressure distribution 4. Helmholtz-Kirchhoff method (Flow determination) 5. Bodies of revolution - Pressure distribution 6. Flow, Incompressible - Theory 7. Flow, Turbulent - Theory 8. NACA TN 3168.

On calculating incompressible turbulent boundary layers with arbitrary pressure distribution, by H. Schuh. Sweden. Kungl. Tekniska Högskolan. Institutionen för Flygteknik. Mar 1954. 23p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114836

1. Flow, Turbulent - Theory - Sweden 2. Boundary layer, Turbulent - Theory - Sweden 3. Boundary layer, Turbulent - Pressure distribution - Sweden 4. KTH AERO TN 41.

On the flow of vapor between liquid surfaces, by Warren E. Mathews. California Institute of Technology. Hydrodynamics Laboratory, Pasadena, Calif. May 1953. 151p graphs Available from

Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.25, Photocopy $20.25. PB 114892

An analysis of the one-dimensional flow of vapor between parallel liquid surfaces of identical composition but different temperatures is presented. More important among the new results obtained are 1) an exact solution in closed form of the (non-linear) steady-flow equations, and 2) a relatively simple approximate form of the nonsteady-flow perturbation solution which applies whenever the product of liquid surface spacing and unperturbed current density is not unusually small. Contract N6onr-24420 (NR 062-059). Report no. 21-13.

Shock-turbulence interaction and the generation of noise, by H. S. Ribner. U. S. National Advisory Committee for Aeronautics. Jul 1954. 60p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114831

1. Shock waves - Gases - Collisions - Spectrophotometry 2. Noise - Generation 3. Flow, Supersonic - Turbulence 4. Flow, Turbulent - Shock effects 5. Turbulence, Isotropic 6. NACA TN 3255.

Small-disturbance method for flow of a compressible fluid with velocity potential and stream function as independent variables, by Carl Kaplan. U. S. National Advisory Committee for Aeronautics. Aug 1954. 18p Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114963

1. Flow, Compressible - Theory 2. Flow, Subsonic - Theory 3. Mathematical equations and solutions 4. NACA TN 3229.

Some possibilities of using gas mixtures other than air in aerodynamic research, by Dean R. Chapman. U. S. National Advisory Committee for Aeronautics. Aug 1954. 47p diagr, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114967

1. Wind tunnels - Flow, Gas 2. Gases - Use in wind tunnels 3. Flow, Compressible - Measurement 4. Gases - Thermodynamic properties 5. Gases - Viscosity 6. NACA TN 3226.

Theoretical investigation at subsonic speeds of the flow ahead of a slender incluned parabolic-arc body of revolution and correlation with experimental data obtained at low speeds, by William Letko and Edward C. B. Danforth, III. U. S. National Advisory Committee for Aeronautics. Jul 1954. 56p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 114754

1. Flow, Subsonic - Theory 2. Bodies of revolution - Pressure distribution 3. Bodies of revolution - Subsonic characteristics 4. Wings - Angle of attack 5. Wings - Lift 6. Mach number - Effect 7. NACA TN 3205.

Marine Transportation

Dynamische dehnungsmessungen am druckkörper von U446 bei ansprengungen (Zweiter teil) (Measurements of dynamic deformations on the pressure hull of submarine U446 as a result of underwater explosions, part 2), by Eckhardt Hienrich. Translated and edited by F. A. Raven. Jun 1954. 27p drawings, diagrs, graph, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photocopy $4.00. PB 114656

Translated from M.A.N. Forschungsanstalt für Mechanik und Gestaltung, Abt. Dyn. Messungen, 16 Apr 1945. Report 117/990-533.
1. U446 (Submarine) 2. Submarines - Hulls - Deformation - Measurements - Germany 3. Submarines - Hulls - Effect of explosions - Germany 4. Explosions, Underwater - Damage - Germany 5. NAVSHIPS T 563 6. STS 197.

Oscillations of ships in a solitary wave, by R. C. MacCamy, R. A. Fuchs and O. Sibul. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. May 1954. 17p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photocopy $2.75. PB 114745

Two approximate theories for the heaving, pitching and surging of a rectangular block in a solitary wave are presented. The first follows the usual Froude-Kriloff hypothesis and leads to an ordinary second order differential equation which is solved up to a numerical integration. The second method proceeds from linear shallow water theory and yields, as an intermediate step, an explicit expression for the response factors of the block, i.e., the motion in a uniform sinusoidal wave train. The theoretical results are compared with experimental observations in a wave channel. Contract Nonr-222(18) (NR 084-079). UC IER Ser. 61, Issue 6.

PATENTS

Ceramic, paper, rubber, textile, wood, and other products and processes: Government-owned inventions available for license. U. S. Government Patents Board. 1954. 30p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111470

Described in this book are 308 Government-owned inventions covered by patents active as of Dec 31, 1953. For each invention, the title of the invention, the U. S. patent number, the name of the inventor, the name of the Government agency administering the patent, and an abstract of the patent are given. GPB PA 7.

SELECTED LIST OF ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

The following Atomic Energy reports selected from recent issues of Nuclear Science Abstracts, an Atomic Energy Commission periodical, are presented here because of their interest and usefulness to general industry. Reports for which a price is given may be purchased in accordance with instructions on inside front cover of this publication. Others may be consulated at one of the following Industrial Information Depository Libraries: Atomic Industrial Forum, Inc., 260 Madison Ave., New York, N. Y.; John Crerar Library, 86 East Randolph St., Chicago, Illinois; Stanford Research Institute, Stanford, Calif.

The reports listed below are grouped under one or more of the following nine broad categories: Chemistry and Chemical Engineering; Construction and Civil Engineering; Electronics and Electrical Engineering; Health and Safety; Industrial Management; Mechanics and Mechanical Engineering; Metallurgy and Ceramics; Mining and Geology; and Nuclear Technology.

Reproduction in whole or part of any report listed herein is encouraged by the U. S. Atomic Energy Commission, subject to the approval of authors or originating sites. General inquiries from the industrial press about AEC-developed information should be directed to the Industrial Information Branch, Atomic Energy Commission, Washington 25, D. C.

Unclassified reports considered to be of special interest to general industry issued by AEC prior to July 1953 are listed or abstracted in a series of bibliographies (TID-3050), which may be purchased from the Office of Technical Services.

BIOLOGY AND MEDICINE

Semiannual report to The Atomic Energy Commission, by Leon O. Jacobson, M.D. Argonne Cancer Research Hospital. March 1954. Contract AT-(11-1)-69. 62p. Microfilm $3.25, Photocopy $9.00. (ACRH-1)

A comparison of computed and measured ground-level dose rates from radioargon emitted by the Brookhaven reactor stack, by Irving A. Singer. Brookhaven National Laboratory. May 1954. 45p. Microfilm $2.75, Photocopy $6.50. (BNL 292 (T-49))

Bactericidal effects of ionizing radiations on E. coli, B. thermoacidurans, and CL. sporogenes as influenced by different conditions of atmosphere, medium, and physical state in which samples are irradiated. Final report for the period January 1, 1954 through June 30, 1954, by Bernard E. Proctor and Samuel A. Goldblith. Massachusetts Institute of Technology. June 30, 1954. Contract AT(30-1)-1164. 43p. Microfilm $2.75, Photocopy $6.50. (NYO-3344)

Annual report on research project, by G. Failla and H. H. Rossi. Radiological Research Laboratory, Columbia University. April 1, 1954. Contract No. AT-30-1-GEN-70. 149p. $.95. (NYO-4582)

The use of P^{32} in the identification of intraocular tumors, by J. S. Krohmer, C. I. Thomas, J. P. Storaasli, and Hymer L. Friedell. Western Reserve University. July 23, 1954. Contract No. W-31-109-eng-78. 24p. Microfilm $2.25, Photocopy $4.00. (NYO-4961)

A comparison of the magnitude of cysteine antagonism toward small and large doses of x-irradiation, by Paul R. Salerno, Ph.D. and Hymer L. Friedell, M.D. Western Reserve University. June 28, 1954. Contract W31-109-eng-78. 14p. Microfilm $2.00, Photocopy $2.75. (NYO-4963)

Synergistic effect of radioisotopes used in combination, by Paul R. Salerno, Ph.D. and Hymer L. Friedell, M.D. Western Reserve University. August 6, 1954. Contract W31-109-eng-78. 45p. Microfilm $2.75, Photocopy $6.50. (NYO-4965)

Clinical clearance rate measurements for the accumulation of I^{131} by the thyroid gland. Part I. Methods, by William J. MacIntyre, Ph.D. and others. Western Reserve University. Contract W31-109-eng-78. August 27, 1954. 22p. Microfilm $2.25, Photocopy $4.00. (NYO-4966)

Comparison of the protective effects of D and L isomers of cysteine against total body radiation and nitrogen mustard in rats, by J. P. Storaasli, M. D., S. Rosenberg, M.D., and A. Weisberger, M. D. Western Reserve University. August 6, 1954. Contract W31-109-eng-78. 15p. Microfilm $2.00, Photocopy $2.75. (NYO-4967)

Progress report, January 1, 1954 - July 31, 1954, by Robert S. Stone, M.D. and Gail D. Adams, Ph.D. Radiological Laboratory, Univ. of Calif., School of Medicine. August 27, 1954. Contract no. AT-11-1-GEN-10, Project no. 2. 25p. Microfilm $2.25, Photocopy $4.00. (UCSF-9)

Study of flash burns: The effect of spectral distribution on the production of cutaneous burns, by K. M. Berkley, T. P. Davis, and H. E. Pearse. The University of Rochester. July 13, 1954. Contract W-7401-eng-49. 25p. Microfilm $2.25, Photocopy $4.00. (UR-336)

Study on flash burns: Evaluation of surface appearance of burns by depth of damage, by K. M. Berkley. The University of Rochester. July 13, 1954. Contract W-7401-eng-49. 16p. Microfilm $2.00, Photocopy $2.75. (UR-337)

Toxicology of the organic phosphate esters, by Frances Haven and Kenneth Lauterbach. The University of Rochester. July 2, 1954. Contract W-7401-eng-49. 37p. Microfilm $2.50, Photocopy $5.25. (UR-342)

Nickel carbonyl, review of literature, by F. L. Haven. The University of Rochester. July 14, 1954. Contract W-7401-eng-49. 17p. Microfilm $2.00, Photocopy $2.75. (UR-347)

Studies on the acute effects of x-irradiation and P-32 on 21 and 32 day old rats, by Melvin R. Sikov and Thomas R. Noonan. The University of Rochester. August 4, 1954. Contract W-7401-eng-49. 13p. Microfilm $2.00, Photocopy $2.75. (UR-352)

CHEMISTRY AND CHEMICAL ENGINEERING

Studies on the anodic polarization of zirconium—growth rates and thicknesses of the very thin anodic oxide films, by George B. Adams, Jr, Marie Maraghini, and Pierre Van Rysselberghe. Dept. of Chemistry, Univ. of Oregon. July 1954. Contract no. AT (45-1)-535. 32p. Microfilm $2.50, Photocopy $5.25. (AECU-2918)

Revised radiochemical iodine analytical procedure, by Elton H. Turk. Argonne National Laboratory. July 1954. Contract W-31-109-eng-38. 12p. Microfilm $2.00, Photocopy $2.75. (ANL-5271)

Uranyl fluorescence intensity and decay, by Eugene Rabinowitch. Argonne National Laboratory. July 1954. Contract W-31-109-eng-38. 49p. Microfilm $2.75, Photocopy $6.50. (ANL-5291)

The heats of formation of uranium hydride uranium deuteride and uranium tritide at 25°C, by B. M. Abraham and H. E. Flotow. Argonne National Laboratory. June 1954. Contract W-31-109-eng-38. Microfilm $2.00, Photocopy $2.75. (ANL-5295)

A continuous flow pH meter for high-pressure service, W. H. Marburger, Kermit Anderson, and G. L. Wigle. Argonne National Laboratory. July 1954. Contract W-31-109-eng-38. 18p. Microfilm $2.00, Photocopy $2.75. (ANL-5298)

Preparation of pure dimethylberyllium, including a survey of the literature, by Sherman W. Rabideau, Mohammed Alei, Jr., and Charles E. Holley, Jr. May 1954. Contract W-7405-eng-36. 11p. Microfilm $2.00, Photocopy $2.75. (LA-1687)

The half-life of yttrium-90, by H. W. Kirby and Murrell L. Salutsky. Mound Laboratory. February 1, 1954. Contract No. AT-33-1-GEN-53. 8p. Microfilm $1.50, Photocopy $1.50. (MLM-937)

Physical properties of irradiated plastics, by O. Sisman and C. D. Bopp. Reactor Technology Division, Oak Ridge National Laboratory. June 29, 1951. 225p. $.65. (ORNL-928)

Calculation manual for liquid-liquid extractions, by F. P. Pike. Chemical Technology Division, Oak Ridge National Laboratory. May 31, 1951. 129p. Contract no. W-7405-eng-26. $.45. (ORNL-929)

Decomposition of carbon dioxide by ionizing radiation. Semi-annual report, by A. J. Hogan. Department of Chemistry, Rensselaer Polytechnic Institute. April 1, 1954. Contract No. AT(30-3)-52. 27p. Microfilm $2.25, Photocopy $4.00. (SO-3255)

The diffusion-distillation process for the separation of isotopes. Semi-annual report, by J. H. Atkins. Department of Chemistry, Rensselaer Polytechnic Institute. April 1, 1954. Contract no. AT(30-3)-52. 13p. Microfilm $2.00, Photocopy $2.75. (SO-3256)

Film boiling of flowing subcooled liquids, thesis, by Eugene Izoard Motte. Radiation Laboratory, University of Calif., Berkeley, Calif. June 1954. Contract no. W-7405-eng-48. 139p. $.90. (UCRL-2511)

An estimate of the predominant chemical species resulting from a shallow underwater burst of an atomic bomb, by L. R. Bunney and N. E. Ballou. U. S. Naval Radiological Defense Laboratory. February 5, 1954. 28p. Microfilm $2.25, Photocopy $4.00. (USNRDL-435)

Physical state of fission product elements following their vaporization in distilled water and seawater, by A. E. Greendale and N. E. Ballou. U. S. Naval Radiological Defense Laboratory. 32p. Microfilm $2.50, Photocopy $5.25. (USNRDL-436)

GEOLOGY AND MINERALOGY

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